

UNITED STATES ATTORNEY

AMERICAN COMPANY IN AMERICA, ET AL.

APPEAL FROM THE UNITED STATES DISTRICT COURT FOR THE
SOUTHERN DISTRICT OF NEW YORK

FILED MAY 11, 1940

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SUPREME COURT OF THE UNITED STATES

OCTOBER TERM, 1963

No. 204

UNITED STATES, APPELLANT,

vs.

ALUMINUM COMPANY OF AMERICA, ET AL.

APPEAL FROM THE UNITED STATES DISTRICT COURT FOR THE
NORTHERN DISTRICT OF NEW YORK

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382—"Polyethylene Insulated Cables for Primary Distribution and Similar Applications" by R. C. Graham, Chief Engineer, Rome Cable Division of Alcoa, dated April 1, 1960	5776	2591
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[fol. 5141] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 114

cc: A. D. R. Fraser, R. A. Schatzel, S. O. Williams.

October 21, 1955.

Mr. Clarence Glass,
Anaconda Company,
25 Broadway,
New York 4, New York.

Dear Mr. Glass:

Your courtesy last Wednesday was most appreciated even if you could hold forth no hope of our getting any nearby aluminum. We understand at the present time you are not in a position to supply aluminum to our specification which is 99.55 E.C.H. Boronized aluminum pig. We do hope, however, that it will not be too long before you will be into this grade of aluminum.

Although you are not in a position to supply us at the present time we are wondering if there is any possibility of your supplying us with an aluminum of a lower grade for delivery to a point no further east than Chicago. If this is possible we should like to get information from you as to the availability of 50 to 100 tons of this material in the hopes that we could make a switch.

We are very anxious to become a customer of Anaconda in aluminum as well as in copper. We understand the many difficulties in getting started, but hope that it will not be too long before you will be as anxious to sell us as we are to purchase.

Sincerely, Rome Cable Corporation, —, —, Executive Vice President.

JHD:AS

1994

[fol. 5142] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 115

cc: A. D. R. Fraser.

November 18, 1955.

Mr. R. Murray Willard,
District Sales Manager,
Aluminum Company of America,
90 State Street,
Albany 7, New York.

Dear Jess:

In answer to your November 10th letter, I have just returned from a California trip, consequently the delay in answering.

Ross will definitely be in Rome on December 1st and possibly the afternoon of November 30th. If there is any way you could rearrange your schedule it might be better to be here on the 1st, but he will make every effort to be in Rome on the 30th, in the event your schedule is inflexible. We shall look forward to seeing both you and Mr. McKee.

Bill was in to see me, and I gave him the sad story of our first attempts at swimming in the aluminum pond. As we expected, no other supplier finds us particularly attractive as a customer for the foreseeable future. It begins to look as though we shall have to depend upon you for our full requirements for at least the first quarter of 1956. You have probably heard of the increased demand for cables on your own company, so that you can well imagine that holding us to 300,000 lbs. a month is going to be a distinct hardship. In view of the situation we hope that you can be somewhat more generous. As one potential aluminum supplier told us, we could have been in the picture by now if we had been in a position to purchase metal during the first half of 1954. I guess our respective timing has been rather bad.

We shall look forward to seeing you week after next:

Sincerely, —, —, Executive Vice President.

JHD:AS

[fol. 5143] P.S.—Can we make reservations for you at the Green Lantern? We are hoping that you will have lunch or dinner with us—or better yet, both of them.

[fol. 5144] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 116

To: A. D. R. Fraser.

From: J. H. Dyett.

Date: November 22, 1955.

Subject: Kaiser Aluminum.

When I was in Oakland I met the following Kaiser personnel:

Messrs. D. C. Rhoades, Vice President & General Manager.

Tom Ready, Vice President in Charge of Operations.
Ford Lovelace, Mr. Inch's assistant in sales.

They all appeared to have considerable faith in the growth of the aluminum wire and cable business. Ravenswood should be in big production by 1957. I told them we should like to start very shortly at 50 tons a month and progressing at the earliest possible time to 100 tons per month. They would make no commitments but urged that we see their Chicago people. They seemed to know quite a bit about our company and Alcoa's plans of going into Polyethylene. They emphasized what a cheap purchase their Newark plant had been. Mr. Ready was amazed at Cerro de Pasco's buying of Circle. He stated that if Kaiser had known, it perhaps would have been interested in purchasing the company.

In Chicago on November 16th I met with Gillette Houck, Carl Ferguson of the electrical conductor office, Don Walker, and his assistant Verne Lorch, in the office of sales of pig and ingot, Maurice O'Halloran in charge of rod sales, as well as John Menz, the General Sales Manager. Mr. Walker stated that the first quarter was probably out but that they might possibly make a start with us in the second. He emphasized that the fourth quarter government relief must be replaced by April. He said that it was too bad we had not tried to buy from them earlier in 1955 since we would now be in their picture. Anything they could give us at the present time would have to be at the expense of their other customers. Mr. Walker also said that 1956 looked bad and that 1957 looked even tighter. After hear-

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ing this story Mr. Menz tempered it somewhat by saying that it was hard to look ahead in the metal business and that he thought something might develop before anticipated. I told each one of them that we were most anxious to have Kaiser as a supplier but that in our opinion we would not have to wait to get suitable sources as long as 1957.

In line with my visits in Oakland and Chicago you might be interested in what American Metal Market November 18th issue stated: "The total aluminum supply including primary, secondary and imported metal for 1956 will amount to 2,350,000 tons. . . . Net year requirements, exclusive of any stockpiling calls, will run from 2,050,000 to 2,150,000 tons." These are guesstimates made by a panel consisting of Mr. Nash from Alcon, Mr. David Reynolds of Reynolds Metals, Mr. Wilmot of Alcoa and Mr. Rhoades of Kaiser.

Jack.

JHD:AS

cc: R. A. Schatzel, G. E. Rolston, C. H. Ellis, S. O. Williams.

[fol. 5145] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 117

December 2, 1955.

Mr. John L. Loeb,
Carl M. Loeb, Rhoades & Co.,
42 Wall Street,
New York 5, New York.

Dear John:

Armand certainly sent Mr. Trefethen a most helpful letter. For your information, Kaiser has sold us 50,000 lbs. of aluminum rod. Although this is not the type of material we wish to purchase it will help us through a tough period in January. It is our hope that it will not be too long before Kaiser becomes a supplier of aluminum pig.

We continue to have our problems in getting enough

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copper, but it looks as though operations for both December and January will be at satisfactory levels.

We do not expect to be in New York again for any length of time until mid-January at which time we are hoping you and Peter will reserve an evening for us.

Sincerely, —, —.

Enc.

JHD:AS

[Vol. 5146] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 118

**ROME CABLE
CORPORATION**

ROME, N.Y.

U.S. DEPT.
OF JUSTICE**REPORT SUBMITTED TO THE BOARD OF DIRECTORS
OF ROME CABLE CORPORATION AT THEIR MEETING
DECEMBER 13, 1955**

I present herewith net sales and earnings by fiscal years up to March 31, 1955,
and by quarters for the current year, the month of October and estimate for
November:

<u>Fiscal Year Ended</u>	<u>Net Sales</u>	<u>Earnings</u>
March 31, 1937	\$ 1,798,092	1,616
March 31, 1938	4,957,103	71,027
March 31, 1939	5,370,665	245,036
March 31, 1940	6,080,902	297,736
March 31, 1941	9,465,451	431,501
March 31, 1942	11,631,785	592,135
March 31, 1943	12,712,333	367,654
March 31, 1944	16,909,735	466,709
March 31, 1945	22,798,218	486,653
March 31, 1946	16,975,009	398,973
March 31, 1947	18,436,305	1,359,593
March 31, 1948	25,202,853	1,152,579
March 31, 1949	26,088,523	1,115,960
March 31, 1950	19,602,984	302,209)
	Plus: Transfer from contingency reserve	) ) 150,000)
		452,209
March 31, 1951	35,142,901	Net \$ 1,922,136
		Minus:
		Transfer to
		copper
		reserve
		150,000
March 31, 1952	42,657,848	1,772,136
March 31, 1953	54,632,976	1,753,651
March 31, 1954	44,114,825	2,008,321
March 31, 1955	39,186,095	1,637,787
		930,879
April-June Quarter	11,687,152	379,847
July-Sept. Quarter	13,931,255	471,316
Total Six Months	25,618,407	851,163

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ROME CABLE CORPORATION

<u>Fiscal Year Ended</u>	<u>Net Sales</u>	<u>Earnings</u>
Total Six Months 1955	\$ 25,618,407	\$ 851,163
October, 1955	5,185,657	187,248
Total Seven Months	\$ 30,804,064	\$1,038,411
November, 1955 (Est.)	4,569,000	160,000
December, 1955 (Est.)	5,337,000	194,000
Total Third Quarter (Est.)	15,091,657	541,248
Total Nine Months (Est.)	\$ 40,710,064	\$ 1,392,411

EARNINGS

November showed a drop in sales volume of approximately 10 per cent below October, largely due to lateness in copper arrival, which will be made up in December and bring the total dollar volume of sales for the quarter to a new high. Present trends indicate a net earnings picture somewhere between \$1,900,000 and \$2,000,000 for the year. Of the seven months earnings in the current year \$923,000 came from Rome operations and \$115,000 from Torrance. Total for both plants is more than double the results of the previous year.

SALES

The breakdown of sales before deduction for discount and freight from April to November 30, 1955, with November figures estimated, are given below:

	<u>April - November 1955</u>	<u>April - November 1954</u>	<u>% Increase or (Decrease)</u>
Rods	\$ 4,268,000	\$ 3,513,107	21.5
Bare	6,175,000	4,190,460	47.4
Weatherproof	2,295,000	1,655,069	38.7
Magnet	2,486,000	1,745,700	42.4
Rubber Covered	14,015,000	10,026,234	39.8
Torrance - E. M. T.	1,997,000	1,632,401	22.3
Rigid	1,804,000	1,154,354	56.3
Spiral 4	1,230,000	822,545	49.4
Aluminum	2,695,000	1,766,835	52.5
	\$ 36,965,000	\$ 26,505,703	39.5

On the basis of equivalent copper for the two periods the current year increase would be 25 per cent above 1954.

We estimate that the fiscal year in physical volume will be 40 per cent above 1954 and about 25 per cent on the same copper basis. Actual production increase in the current quarter is much greater than the 7 per cent of sales increase, levels because of the heavy inventory liquidation that occurred in the July-September quarter.

[fol. 5148]

ROME CABLE CORPORATION**BACKLOG OF ORDERS**

	<u>Value</u>
Jan. 2, 1955 - Rome - Wire Products	\$ 2,287,000
Aluminum	338,000
Spiral 4	1,845,000
-Terrance- E. M. T.	38,000
Rigid	19,000
T. V. Mast	-0-
	<u>\$ 4,519,000</u>
June 30, 1955 - Rome - Wire Products	\$ 3,472,000
Aluminum	731,000
Spiral 4	1,435,000
-Terrance - E. M. T.	77,000
Rigid	153,000
T. V. Mast	13,000
	<u>\$ 5,881,000</u>
Nov. 30, 1955 - Rome - Wire Products	\$ 5,605,000
Aluminum	774,000
Spiral 4	615,000
-Terrance- E. M. T.	308,000
Rigid	37,000
T. V. Mast	184,000
	<u>\$ 7,525,000</u>

The above figures on backlog of orders show a steady rise during the year, with the exception of Spiral 4 contract which expires next March. We have made a bid on requirements for next year but have not heard the results.

Incoming orders for the first eleven months of the calendar year show a 48 per cent dollar gain in total over a year ago for Rome plant and 39 per cent for Terrance. On poundage of copper orders are 18 per cent ahead of a year ago and orders received on aluminum 78 per cent.

COPPER

Since my last report copper sold by the principal domestic producers has remained at 43 cents per pound. On the other hand the custom smelters and metal dealers have been charging premiums ranging between two and seven cents per pound. During October world copper production established a new record, but the high demands of a booming European economy and buying for year-end inventory purposes in this Country have kept copper at historically high prices and in short supply. Rome Cable, I feel, has been well treated by its suppliers. However, the effects of last summer's disastrous copper strikes remain with us, and late deliveries caused

[fol. 5149]

ROME CABLE CORPORATION**COPPER -Cont'd**

lower shipments in November than budgeted. Barring strikes throughout the world we expect to receive sufficient copper in December and January to fill most of our customers' requirements. By February or March we hope that supply will balance the demand and the premium price for smaller copper disappear.

ALUMINUM

Although our aluminum needs have been satisfactorily met by ALCOA the present allocations to us for the remainder of the fiscal year provide only for the present level of operations at a time when more of our customers are switching to aluminum in protest against copper's high price and new outlets could be developed. Since ALCOA in October advised us that we should no longer depend on them as our sole source of aluminum pig, we have actively been trying to get on the books of other aluminum suppliers. To date we have had only limited success with Kaiser, but we believe in a few months we can begin to rely on one or two other sources in addition to ALCOA.

STEEL

Steel likewise continues in limited supply, but we have been able to get sufficient supplies to increase our production of thin wall conduit for the next few months. If the steel companies maintain their delivery promises, we should be in a position to meet our customers requirements unless the anticipated steel sheet price increase forces an unusually large demand for conduit.

PAYROLL STATISTICS

Our factory payrolls covering number of employees, weekly payroll, average weekly wage and average hours worked for period a year ago, six months ago and the last week available, as well as number of monthly salaried employees for both Rome and Torrance are shown below:

Torrance are shown below:						
<u>Week Ending</u>	<u>No.</u> <u>Employees</u>	<u>Total</u> <u>Payroll</u>	<u>Avg. Weekly</u> <u>Wage</u>	<u>Avg. Hrs.</u> <u>Worked</u>	<u>No.</u> <u>Salaried</u> <u>Employees</u>	
<u>ROME</u>						
12/5/54	M 841	\$ 77,311.85	\$ 91.93	43.6		
	F 22	1,407.04	63.96	39.4	411	
6/12/55	M 856	\$ 76,183.41	\$ 89.00	42.7		
	F 37	2,234.36	60.39	37.2	411	
12/4/55	M 883	\$ 89,775.04	\$101.67	46.0		
	F 40	2,825.02	70.62	40.8	419	
<u>TORRANCE</u>						
12/4/54	139	\$ 12,612.48	\$ 90.74	40.0	32	
6/25/55	123	11,509.08	93.57	40.6	37	
12/2/55	130	12,483.11	96.02	41.1	48*	

* Due to transfer of 9 sub-foremen from hourly to monthly salaried payroll.

[fol. 5150]

ROME CABLE CORPORATION**PAYROLL STATISTICS -Cont'd**

It is worthy to note that the increase in number of employees at both Rome and Torrance in the last year is considerably less than the increase in output.

LABOR

The CIO Steel Workers Union and the A F of L Machinists Union informed us that they had enough signed cards from employees to warrant an NLRB supervised election at Torrance. This was held on November 3, 1955 and a majority of our employees voted for no Union. Our majority was cut considerably from the previous year and our Torrance Manager has made an excellent analysis of reasons for this changing trend and attitude, and steps are under way by an educational program to rectify the conditions and misunderstandings.

Contract has been signed in Rome covering maintenance employees extending the contract to October 7, 1957, without any changes from our voluntary offer of July 27th. There is a reopening possible on October 7, 1956 regarding rates.

With the recently accomplished merger of A. F. of L. and C. I. O. we can expect increasing and better planned pressure upon both plants for complete unionization. Our personal and employee relations have been well handled in the past. This is a new challenge for the future.

CAPITAL EXPENDITURES

Our capital expenditure program has changed radically during the year due to better business outlook. We entered the new fiscal year with a carry-over of \$324,000 unpaid for authorized expenditures from prior years. Our original informal authorization added a total of \$545,000 to that figure. This was supplemented in September with another \$165,000 for reconstruction of Building 1, and additional extruding equipment at a cost of \$125,000 to take care of both increased ALCOA demands for neoprene, plus our own needs for additional plastic capacity. There was also added \$185,000 for additional Properol equipment. As a result our total authorizations plus carry-overs will total in the neighborhood of \$1,350,000 for the year of which carry-overs will approximate \$200,000, leaving a net addition of about \$1,150,000 for the fiscal year. All but approximately \$130,000 of this amount was for Rome expenditures. Our depreciation for the current year will run \$655,000 for Rome and \$195,000 for Torrance, or a total of \$850,000.

Because of the increasing lead time necessary to get new equipment I asked our Operating Department at both plants to submit a preliminary request covering suggested requirements for the next fiscal year. These have not been screened or generally discussed by the Executive Committee at the time of writing this report but the grand total approximates \$1,000,000. In the light of other discussions which we will have at this meeting I urge a very careful scrutiny and a partial approval of

[fol. 5151]

ROME CABLE CORPORATION**CAPITAL EXPENDITURES - Cont'd.**

the most necessary items, and then having the whole program synchronized with our overall cash requirements for the new year.

For your information capital expenditures approved since the last meeting are listed separately.

ROME PLANT OPERATIONS

I am very pleased with the progress that has been made on plant rearrangement in Rome. About two-thirds of the program is completed and savings already made are running approximately 50% of our overall estimate. Shipping and Receiving Departments, as well as the Magnet Wire Dept., have been relocated. Several insulating sub-departments have been moved to Spiral Four building, the saturating and finishing departments and tool room have been rearranged. There still remain the rearrangement of the C-V Dept., installation of the new Properal in the reconstructed building, moving of Spiral Four and certain other sub-sections of the insulating department to complete our rehabilitation program. We commend the Production Dept. for their excellent production record which not only has had to contend with moving equipment but in some cases serious lack of copper.

TORRANCE

Torrance has made notable strides in cost reduction by cutting scrap, increasing percentage of operations on incentive. Their new warehouse will save considerably on outside warehouse rent and duplicate handling of material. By next quarter we should be successfully galvanizing the thread of our rigid pipe and we hope we can have a decision that would eliminate our costly enameling operation.

I am urging factory, engineering and sales for a decision on the protective coating problem for Torrance that might enable us to write off the \$60,000 of unsuited equipment at very substantial annual savings for the future. Elimination of this enameling unit would provide sufficient space for one or two plastic extruders, which would enable us to begin manufacture of plastic wire at Torrance.

Industrial tubing business is showing a healthy growth. If either one of the two competitors who are asking us to make EMT for them for their West Coast needs should finally decide to do so this increased load would add very materially to the profits of the Torrance operations. At Glenn Koger's request we are investigating the cost of acquiring the additional 5 acres adjoining our plant which belongs to the City of Torrance.

[fol. 5152]

ROME CABLE CORPORATION**DIVIDENDS**

In view of heavy demands on cash I consider it wise to recommend declaration of Dividend No. 67 at the regular rate of 35 cents per share payable on January 4, 1956 to share owners of record on December 23, 1955. If our present projected earnings for the current fiscal year materialize I believe we could well consider a 5 per cent stock dividend at our next Directors' meeting.

I also recommend payment of cash dividend to employees on the same date at 17-1/2 cents per participating unit, and that a contribution of an additional one-third of that amount be added to the Rome Cable Employee Profit-Sharing Trust Fund.

PENSION PLAN

We will have available for the meeting a proposed contract with Massachusetts Mutual Life Insurance Co. to handle all record keeping, actuarial computation and disbursements on our Pension Plan on what is known as a split fund basis. If we were planning to amortize past service liability over a thirty year basis payment of \$120,000 for the first year would be made to the insurance company and a fixed amount of \$195,000 would be made to the bank trustees, J. P. Morgan & Co. For tax purposes we would be allowed a total contribution of \$438,000 in the current fiscal year and we are accruing expenses at that rate. If we were able to maintain that rate of payment for eleven years a net saving of over \$800,000 would accrue to the Company. Such advances could likewise cushion or reduce heavy payments in a year of poor operations. I strongly recommend our planning on a contribution of \$438,000 before March 31, 1956.

There are a number of policy matters regarding the pension contracts with Massachusetts Mutual Life Insurance Co. and J. P. Morgan & Co. Incorporated that will be covered in a separate memorandum and on which I would like to have your decision and action at this meeting. As soon as the contracts have your approval we shall proceed to get Treasury approval on both Pension and Profit-Sharing Plan if humanly possible before the end of our fiscal year.

ROME CABLE EMPLOYEE PROFIT-SHARING TRUST

There are also some policy decisions to be settled before we can execute a contract with J. P. Morgan & Co. Incorporated on our Employee Profit-Sharing Trust and these will also be covered by a memorandum submitted to the meeting. With the payment to be made on January 4th we will have approximately \$26,000 in the fund. I would like to have the trust instrument executed so that we can start putting it to work rather than having it lie in the bank without interest.

[fol. 5153]

ROME CABLE CORPORATION**ROME CABLE FOUNDATION**

Since 1952 we have contributed \$200,000 in cash and 1000 shares of Rome Cable Common Stock to Rome Cable Foundation. As of November 30th we had \$26,000 in cash and \$126,000 book value of investments (market value \$155,000). Our commitments for the balance of the fiscal year will run approximately \$16,000, which is about the same amount as we have already disbursed. Because of poorer operations last year we had to cut our contributions. I would like to recommend our paying \$75,000 to the Foundation in the current fiscal year, but only paying \$35,000 to them at the present time and awaiting final action on the above recommendation until our March meeting. If you see fit some portion of this contribution could be made from treasury stock. Our scholarship program will cost us about \$14,000 in the current fiscal year.

EXECUTIVE BONUS

At the last meeting we approved the recommendation of the special bonus committee revising the Executive Bonus. It has been customary in prior years to make one or two distributions before the end of a calendar year and in good years these have ranged from \$165,000 to \$200,000. We have done this in an effort to make a more equitable distribution of taxes to the recipients. On the basis of the amount that will be accrued in the bonus fund by December 31st I recommend the payment of \$150,000 at the Treasurer's discretion to those persons authorized at the last meeting of the Board and in the amounts indicated.

CHRISTMAS GIFT

In accordance with past practice I recommend that \$5. Christmas gift be distributed to all employees other than officers who are directors.

GROUP 2 BONUS

For many years we have voted a distribution in December, a payment ranging from 2-1/2 to 7-1/2%, to a group of salaried employees not covered by Executive Bonus or Supervisory Bonus. On the basis of earnings I recommend that a distribution at the rate of 5% be made to those employees qualifying at an estimated cost of approximately \$27,000, most of which has already been accrued. I further recommend that the salary committee be authorized to study and revise this plan.

STOCK PURCHASES

At various times during the year the Finance Committee has authorized the purchase of up to 10,000 shares of our stock. To date we have acquired 8,789 shares of this total at an average price of \$23. 3/4 per share. There are several uses to which this stock could be put - (1) some could be transferred to Rome Cable Foundation or to the Pension or Profit-Sharing Trust at a saving in cash to the Company.

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ROME CABLE CORPORATION**STOCK PURCHASES -Cont'd**

While the cost of acquisition mentioned above runs approximately 15 per cent below current market price, which is the maximum difference allowed by the Internal Revenue Department, and a year has elapsed since our last plan we do not believe that another offering should be made at this time because there is still \$317,000 owing to the Company by 82 individuals on the other three offerings.

It is also possible that such a block of stock might be of use in some of our other programs that will be discussed at this meeting.

MOVIE FILM

We had a showing of our film "CABLE MAKERS" for several hundred of our Rome employees in November and it was well received. Plans are under way to make this available for TV showing.

We just had a showing today on the film which the conduit industry group produced under NEMA auspices. This is a very effective story both on adequate wiring and the use of conduit. We expect to purchase several copies for effective use by our sales department.

SALES MEETING

We had our annual sales meeting in September attended only by District Managers and a small group of Rome people. It was an excellent meeting. The Sales and Engineering Departments are conducting regional meetings throughout the year with marked success.

AMERICAN SYNTHETIC RUBBER

You will recall that our Board authorized the investment of up to \$100,000 to be pooled with several other wire companies and other synthetic rubber users toward the purchase of the Louisville GRS plant from the Government. To date we have paid in \$73,000 of our commitment for which we have 430 shares of American Synthetic Rubber Common Stock and \$30,000 of 4-1/2% Debentures. We received our first debenture interest check in November in an amount of \$ 675. I have also just received the six months' interim statement through October 31, 1955 which shows a very satisfactory earning during that period. Earnings are \$691,000 after taxes or approximately \$27. per share of the 25,113 shares outstanding. Their Board of Directors is considering a further expansion program. Production currently is at a rate of 20% in excess of rated capacity for the facility.

[fol. 5155]

ROME CABLE CORPORATION**RENEGOTIATION**

We have had several meetings with the New York Regional Board handling our renegotiation case. For the fiscal year ended March 31, 1952 they have asked for a gross refund of \$150,000, which after tax credit amounts to \$24,000. Sufficient amount has been set up in our tax accrual to cover such a payment. We made one final effort, in a letter by Mr. Fraser, which strongly indicated our reluctance to accept their determination. We have received their reply stating they have further reviewed our case and are standing firm on their first determination. The course of action left to us is to either accept their recommendation or take our appeal to Washington. I would like to have some discussion of this at the meeting. My own recommendation at the moment is that we accept with a strong letter emphasizing that the determination which we are accepting for that year is being accepted without prejudice that might affect the two following years.

PRICES

Because of metal scarcity and heavy demands for the products of the wire industry prices have been more stable over the past few months than for a long time. Our products are being sold on a price based on 43 cent copper while the average purchase price of the raw metal by companies other than producer controlled is in excess of that owing to higher prices charged by smelters and other small producers. We have absorbed over a quarter of a million dollars loss in the first seven months of this fiscal year due to this condition.

ALCOA AGREEMENT

We had a meeting with representatives of the Aluminum Co. of America early in October. They indicated that they were going to put in their own extruding facilities for the production of plastic covered aluminum wires and that we would probably only be supplying small quantities of this type to them by next October. On neoprene, however, they told us they had no plans for that production. In fact almost immediately after that meeting they asked us to further increase our production for them. By manipulation of shifts we have been able to almost double that production. In November we had an official request to expand our facilities and accordingly after discussion have authorized the purchase of another CY insulating machine and are accordingly writing ALCOA to extend our agreement with them on this product to a total of 7,000,000 feet per month, which is more than three times the average that we supplied in the first eight months of the year. We have asked that the agreement be extended to January 1, 1958, with provisions for extending the agreement should both parties so desire. This should prove a very satisfactory and lucrative lead for our plant.

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ROME CABLE CORPORATION

THE FUTURE

The majority of the indices and predictions for the year 1956 talk of output and demand in excess of the current year. Every now and then we see and hear something which could well urge a note of caution. I hope we will have time to get your individual views as a means of determining policies for 1956. Such discussion could well encompass the all important step up in the cold war, our basic raw materials supply situation, our immediate expansion program, and certainly the financial needs which this would involve. We have ceased to be a small company but cannot yet be classed in the realm of being a big company. Such growth as we have had in a span of less than twenty years could not help but leave us with growing pains.

Whatever doubt, if any, there may be regarding the year 1956 certainly the prognostications and prophecies for industrial growth particularly in the electrical manufacturing and utility industries, which we serve, and the chemical industry which serves us are nothing short of fantastic whether it be ten, fifteen or twenty-five years that is being considered. Predictions made ten years ago, which seemed to be in the same category then looking at 1955 could well be as far wrong for 1965 to 1980. We have all thought that the pace has been terrific. We must carefully analyse our ability to further step-up our pace.

We have had many discussions in our various "Whither goest thou?" meetings and it seems to me that now we must become more aggressive and more definite in our approach toward the attainment of our goal. We have all agreed that even the maintenance of our present position in the industry must involve considerable expansion. We have discussed some possibilities of mergers. We have had certain nibbles where larger units in both allied and unrelated industries have shown interest in us. Diversification and bigness are every day subjects of discussion. We have had many discussions as to how best to plan our own destiny for the best mutual interest of share owners and employees alike. I think we have looked at the matter unselfishly.

Our most recent meetings seemed to have centered around rounding out our product line through the possibility of acquiring some smaller companies which could help accomplish this purpose as well as disperse our production facilities on a better basis to meet competition. The present pace in the program that we have been carrying out is more of a strain on our present organization than I like to see. Some things of necessity have had to lag and with the probability of adding to our overall program rather than curtailing it cannot help but add to our prospective difficulties. Any expansion move involving any other company should be well screened as to the matter of organization and what additional burden would be placed on the home organization here. At the next organizational audit meeting to be held in January I want each separate section of our company to review our organizational problems more aggressively and constructively.

[Vol. 5157]

ROME CABLE CORPORATION

THE FUTURE - Cont'd

We must carefully search our present younger organization for men who are able to take on larger responsibility and present top executives will have to delegate more responsibility to these men in order to have them available for some of the problems that we face in the future. If my guess as to the program that will be suggested or adopted by this Board today is anywhere near correct. I feel we have done a fine job overall to date in share owner and employee relations and I am proud of our reputation with our suppliers, customers, financial institutions and in the communities where we have plants. We stand very well with our competitors too. While we have done an amazing job of keeping up-to-date, considering the size of our organization I believe the stepped up pace of the future is going to require more serious planned efforts to even maintain our present position.

We must consider expansion of our product line, the new uses of aluminum conductors for building wires, service cable, power cables, welding cables, etc., as well as the possibility of broadening our present limited line of ACER. Trends in rectangular magnet wire indicate rapid growth in demand for rectangular enameled magnet wire. This growth is going on at the expense of the type of product which we produce. It therefore seems vital that we should soon have facilities for production of rectangular enameled magnet wire and a broad line of enamel wire of other types we believe would also be helpful to us.

We have watched the terrific growth in telephone wire demand. Part of our present program of expansion provides some facilities for this.

We still lack the heavy sizes of rigid at Torrance and could well consider some discussion regarding expansion of our industrial tube operations, aluminum tubing and even plastic tubing. Mention was made earlier of potential manufacturing space available for plastic wires at Torrance. There are other locations that should be studied.

Mr. Fraser will bring you up-to-date at the meeting on the interest of some other companies in us and our interest in them, and we should have a discussion as to how this will fit our overall program.

Adoption of any part of this program is going to mean a need for more money and the expenditure of a great deal of energy by the Rome organization. Wherever competent outside services can be hired to do some of this work I am in favor of doing so. I believe it is vital that we as soon as possible determine what our needs are for a good sized student course for the coming year. The competition for the graduates is exceedingly keen and we will probably have to revise upward our ideas of remuneration, with all of its affects on our present organization. There are a number of departments in our organization which need near-term strengthening and if we cannot do it from our upgrading of our own organization we should be initiating steps to find them elsewhere.

[fol. 5158]

ROME CABLE CORPORATION

THE FUTURE - Cont'd.

This whole program is going to be adding to our expenses but I feel that the Board could well consider a sum expended in this fashion as insurance for the future.

I know this whole program is a large order for one day but I hope when the day ends we can consider that some progress has been made.

NEW DIRECTOR

I know I speak for all the members of the Board in extending a very sincere welcome to our new director, "Al" Foote. Each of us know how helpful he has been to us in the past and we are pleased with the opportunity of working more closely with him.

Respectfully submitted,

H. T. Dyett
H. T. DYETT.
Chairman of the Board

[fol. 5159] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 119

A. D. R. Fraser.
J. H. Dyett.
February 24, 1956.

Aluminum.

This week the Syracuse office of Kaiser told us they had 90,000 lbs. for us in the second quarter, 30,000 lbs. each month. This is the first time we have been able to buy any aluminum pig from any source except Alcoa. Kaiser indicated that this was a start on a month to month basis since they did not wish to be in-and-outers.

Last week Andy Hunter and Kurt Gager of Aluminum, salesmen in the eastern section, spent nearly a whole day with us. They were not particularly optimistic as to getting into their month to month schedule but did say that once in a while they had wind-falls. I indicated we would be very happy to have one of these with the understanding that it would not be the basis for a month to month contract.

From the above you can see that we are beginning to make a start.

JHD:AS

[fol. 5160] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 122

cc: G. E. Rolston

A. D. R. Fraser.
J. H. Dyett.
May 15, 1956.

Aluminum.

Within the past week we have had conversations with both Kaiser and Alcoa on the subject of our selling redraw rod. Both these companies received the information that we had been selling to Aerofin Corporation. Messrs. Stout and Ralph Davies of Alcoa and Messrs. Belknap, Berry, Southerland and Tietjen have been advised that this was

only a sample order in the amount of approximately 1,000 lbs. The Kaiser men and Bill Stout were told by both Glenn Rolston and me that we were not currently selling redraw rod, that we were in no position to offer these rods owing to the tight aluminum situation, but we emphasized that we felt this was a normal type business for us in times when metal was not as scarce as it is today.

The Kaiser men left a long-term contract with us to run for a period of 10 years starting January 1957. This contract calls for 600,000 lbs. per year, which we emphasized was a drop in the bucket. They indicated that this would not mean they would not offer us more but that it is merely a part of the amount which the government wishes Kaiser to sell to independent fabricators during this period. We should have Executive Committee consideration of this contract next week.

In talking with Ralph Davies he stated that he would not be surprised to see the aluminum pig situation loosen up within two weeks or so. At present secondary aluminum is quite free and certain customers are turning to this market who had formerly stated they needed primary aluminum. As yet he did not know of any pig availability but intimated that this situation could change very fast. I emphasized that with the cut from 400,000 lbs. to 350,000 lbs. he caused us considerable hardship and that the most that we had been able to get from other sources was 30,000 lbs. a month. He promised that if and when more pig became available that they would consider additional amounts for us. He thought that Aluminum shipments might be increased into this country within the near future. Incidentally, he did not seem to take the Aérofin situation as seriously as Alcoa sales offices.

Gib Wolfe was advised this morning that we could not make any offer to sell Aérofin rods until the overall pig situation had improved.

JHD:AS

[fo]. 5161] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 124

A. D. R. Fraser, G. E. Rolston, S. O. Williams.

J. H. Dyett

June 15, 1956

Alcoa.

On June 13th Bill Stout visited us, and I told him in Stan's presence that in July we were receiving aluminum from a third source and that we now were in the position where we could offer rods. He implied that they would have no objection to this policy, which confirms my conversation of early last month with Ralph Davies.

In respect to next quarter's aluminum from Alcoa, Bill stated that they would not reduce below the 300,000 lbs. a month and that they might possibly have additional tonnage for us. This statement was made after I told him that in line with our conversation last October we were now in a position to give them some relief in July to the extent of 60,000 lbs. if Alcoa actually wished to reduce July shipments to us. I made it very clear that we would be unhappy if they requested it, but we would agree to it since this was our verbal arrangement with Ralph Davies. I asked that he pass this information on to Pittsburgh.

Bill says that Alcoa is now thinking about long term contracts. It is his belief that these would run for a period of five years. I told him of our dislike of contracts which ran for more than one or two years unless there was a fair escape clause. He had been told two months ago that Alcoa would give us additional tonnage if we were going to enter into definite arrangements with other suppliers even if such arrangements did not start until early 1957. He did not know whether or not Alcoa would now favor us making long term contracts with others as the metal is now more plentiful. It seems rather unusual that a supplier would wish us to make contracts and then give us additional tonnages until these contracts became effective at a time when aluminum was scarce. However, I am only reporting what Bill told me.

JHD:AS

[fol. 5162] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 126

Rome Cable Corporation

1956 Sales Conference

Products—G. E. Rolston.

In our program this year we have tried to bring you men more and more into the discussions as you will see later. There is not as much in our part of the program on the products as such. We are not always sure that complete understanding is retained by you people when you go back. Most of the information on the product as such will be forthcoming as Bob said yesterday in the form of bulletins and we are going to try to send out supplementary information of a typical sales character that may supplement information that you get from the Engineering Department. There are, however, a few problems that we are faced with that involve products, the first one of which is aluminum.

You have heard Jack's story about availability. You saw some things in the plant and laboratory and while it is perfectly true that we generally are in a position to produce aluminum conductors with, we will say literally, any of the types of coverings that we now make for copper, they present no problem. Unfortunately, the commercial situation is not at all clear. At the moment, ACSR as a typical example where we have limited our activities in the past, we will expand. With the availability of more aluminum, we are making studies of this freight rate situation, but I believe while I cannot answer it at this time, that we can meet it. In all areas we will definitely expand the areas of ACSR which we have restricted heretofore. One part of our program has been to improve the operations of the Properzi equipment. We have better costs of producing rod than we had some time ago and here again, it is somewhat like a steel mill. If we are going to get those costs down, we are going to have to put more tonnage through those Properzi machines so that factor of quantity is an important one now.

There is no change in general in the picture insofar as covered line wire, whether it be Polyethylene or Neoprene or in Triplex. The commercial picture has been pretty well established for a long time, but when we get over into the area of building wire, RH-RW type or TW to name just the two in that field, we have a situation whereby one of the integrated aluminum manufacturers is exceedingly anxious to introduce aluminum in place of copper. It is our belief that in so doing they are overlooking certain fundamentals and elements of manufacturing costs and profit consideration, and we feel quite frankly that their published price schedules are entirely unrealistic in relation to costs, so much so that in some cases we can't even consider the possibility of having any price levels that would be competitive with that integrated producer. This situation is not peculiar to us. It is chiefly the problem of any other insulated wire manufacturer who is equally anxious as we are to put on a covering over literally any conductor. How soon this situation might be recognized I don't know, but let us go back for a moment to just about four or five years ago. As you know, the introduction of covered aluminum wire and Triplex only dates back in any quantity to the middle of 1951. The same integrated producer was definitely interested in promoting the use of covered aluminum conductors for overhead distribution work and he had published price lists that were approximately 20 to 25% under price lists that we and other insulated wire manufacturers had.

[fol. 5163] We wrote out the criticisms at that time. You fellows traced it and said you couldn't understand why our price was \$120 when they could buy it from an integrated producer for \$100. We believed then as we believe now that part of the problem in their mind was to overcome the resistance and the inertia on the part of utilities and others to change from a copper conductor to aluminum conductor. As time went on the thing became corrected and you now have an industry price level that is relatively uniform in those products. It is my belief and the belief of some others that the same action is being taken now in that it is recognized that the ordinary contractor has certain reluctance in dealing with aluminum conductor so they established a price level which creates enough incentive on the

saving basis to interest them to get into this product line. Now I believe the same thing would happen as heretofore that when such progress has been made and overcome in this inertia and resistance then the price might seek levels at which we think they should be in relation to costs at the present time. The answer to all that is that we are in a practically impossible position to say to you that we are introducing a line of type SE cable, TW building wire, RH-RW, RR cable, RRD, with aluminum conductors. I will say that in the study of this thing, when, as and if we do unless there is some change, they will not be anywhere near the price level that is now public information from this integrated producer. I am telling you in advance that if we do take such action please don't object to the high prices that we will have because that is the situation that is going on at the present time.

I can best give you an illustration of what we believe to be this type of thinking. It is what happened when we were told first hand from this integrated producer that there was three school buildings built out in Iowa in which they had an opportunity to work with the engineers and then subsequently the contractor in the detail layout of these jobs. The intent was very definite that they get aluminum building wire in these three schools. The figures were something like this: that in the original layout that the copper wire, priced as it was at that time, would cost approximately \$75,000. If you used aluminum wire, we will say priced on what I call a conductor substitution that is where you simply take out the copper conductor and put in aluminum and have the same price for the covering would have resulted in about \$62,000, but this particular integrated producer having an interest in getting it across agreed to furnish the wire for \$47,000. Now my reaction to that whole thing was this, wasn't the difference between \$62,000 and \$75,000 sufficient interest to cause them to select aluminum in place of copper? Why did it have to be another \$15,000 below what I would call realistic figures? Well, you can draw your own conclusions just how much you have to offer to someone to get them to overcome years of experience and practice, I don't know but that gives you the relative level.

There are one or two manufacturers who apparently have

decided that they will or have entered into what we will call it, insulated aluminum field. I am talking in building wire or 600 V rubber Neoprene. Their published price schedules as of this time are in the neighborhood of 15 to 20% above the published price schedules of this integrated [fol. 5164] producer. In other words, they have apparently decided that in their case, they too could not recognize this competition so they have brought out published price schedules at this higher level. U.S. Rubber is one, Anaconda Wire & Cable is another and General Cable Corporation is another. Just recently, in fact June the 20th, a new published price schedule of U.S. Rubber was issued on 600 V rubber Neoprene and TW aluminum conductor. That is the situation, so the only way I can see to approach it is to study these individual cases and come up with a decision as to whether or not we think we should go into this field at that level. Don't forget, we cannot afford to sell any of it if we make 500 ft. quantities here and there. It means a decision to manufacture and stock aluminum conductors of this type because you surely can't be in the building wire business 600 V RRD making every order special. We have made quite a considerable quantity of aluminum conductor with rubber Neoprene coverings, those of you who have not run into it as a matter of fact, we produced this cable for use in the Aluminum Company of America plants. We stock in Rome. In fact that stock is available to you. We carry a stock of RRD cable in assorted sizes. It is rather interesting to note that the prices at which we are selling this RRD cable, aluminum conductor, I assure you are not at the price level of this integrated producer,—we cannot meet it. We have been asked if we won't sell aluminum rod. We have already submitted some samples to two different accounts,—so it may well be that very shortly we will be selling $\frac{3}{8}$ " aluminum rod. We will also be interested in furnishing aluminum drawn wire similar to the fabricator customers we have now where we furnish copper. We will work on and expand that activity, but on new types of insulated construction materials in that whole field, we are going to have to go very very slowly.

In connection with the engineering department's program yesterday, they showed you that this problem of making what we call compact type of strand is not a difficult

one. They successfully made it and have a bulletin that will show the range of sizes that can be furnished, but here again, we have got the old commercial problem. If we are going to get anywhere, we just can't have two or three different wires for the same purpose. In other words, it is an awful job now, we've got many different constructions of Triplex and everybody wants a different type of neutral and when you combine Polyethylene with Neoprene and two shot compared to one shot and 500 ft. coils instead of 1,000 ft. reels, we are confronted with many problems.

Now it is my belief that we should not go hog wild on this type, what we will call compact strand. My own experience from the few places I have been in the field is nix. Jim Scheppach and I made calls, 20 minutes apart, in Indiana. One place said they have tried it and like it and they thought maybe that is what they would use. The other one said they had some and they never wanted to hear about it again. I don't know the specific reasons. Just within the last week, there is a report from Dick Gray's territory that Penn Electric bought 30,000 ft. of a Triplex cable with the neutral. They had all kinds of trouble with the particular type of fittings they use. Now that doesn't necessarily mean that this product is not good. There are these [fol. 5165] advantages that were given to you yesterday, but the point I am talking about is put yourself in our place. We certainly can't be talking about one day furnish this type of strand, and another day the other and get any service on it. We will probably have to set up absolute minimums and we may have to say we won't furnish it in less than 50,000 ft. quantities because here again we cannot afford to set up for small quantities. I have had some conversations with the company that has promoted this, Southern Electrical Corporation who started this compact strand and which they call Compresto. I believe the acceptance has been mixed. I am told that it has been well accepted in Texas and Oklahoma and through there. I am also told that in other areas they just don't want any part of it, so I think you have got to steer a pretty careful course in connection with that.

The next thing which Rudy touched on and said that I would mention is our changed equipment with regard to cabling of conductors and the fields which we might enter

both more profitably and in greater quantity than we have in the past. This new cabling machine will certainly give us greatly improved operations and greatly increased capacity on control cables. We are going to have considerably better operations of cabling of conductors. We will be able to go up to 37 conductors of one pass,—in other words as one pass through the machine you can cable up to 37 conductors. Actually by going through several times it brings our normal limit up to I think we can make 91 conductors of the straight away type going through this cable by the several passes which we couldn't do at all. Of course, we can make cables literally with hundreds of conductors depending on the groupings of pairs, triplets, quads, etc. With regard to the specific telephone type which we will call the exchange cable which is tied with the RTA and REA, we have checked the published price schedules of five or six of the people who are principally involved in that business and quite frankly we cannot see that we are going to be able to be competitive with G.C.C., Anaconda, Whitney Blake or Ansonia. Now, as Rudy mentioned, that still does not close the door to those types of cables of which there are many many variations. For instance as a typical example, there is the cable that is mentioned from Duquesne Light. There is a third type of cable, I believe it is going into a new Atomic Energy Plant. Now fundamentally it is this type of cable, but it isn't sold on the basis of the exchange cable price lists, so I just want you to know that when it comes to strictly these REA or RTA exchange cables we will not be competitive.

As Bob Graham told you yesterday, we have now a few new types of polyethylene. Let's make sure we know what we mean when we talk about high density or high molecular weight polyethylene. These terms can be confusing, so acquaint yourself with these new types so we will all know what you really want.

[fol. 5166] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 127

ROME CABLE
CORPORATION

ROME, N.Y.

REPORT SUBMITTED TO THE BOARD OF DIRECTORS
OF ROME CABLE CORPORATION AT THEIR MEETING
NOVEMBER 29, 1956

I present record of sales and earnings after taxes by fiscal years from 1937 to date, and by quarters for the current year, the month of October and estimates for November:

Fiscal Year Ended	Net Sales	Earnings
March 31, 1937	\$ 1,798,092	1,616
March 31, 1938	4,957,103	71,027
March 31, 1939	5,370,665	245,036
March 31, 1940	6,080,902	297,730
March 31, 1941	9,465,451	431,501
March 31, 1942	11,631,785	592,135
March 31, 1943	12,712,333	367,654
March 31, 1944	16,909,735	466,709
March 31, 1945	22,798,218	486,653
March 31, 1946	16,975,009	398,973
March 31, 1947	18,436,305	1,359,593
March 31, 1948	25,202,853	1,152,575
March 31, 1949	26,088,523	1,115,960
March 31, 1950	19,602,984	302,209
	Plus: Transfer from contingency reserve	150,000
March 31, 1951	35,142,901	452,209
	Net	
	Minus: \$1,922,136	
	Transfer to copper reserve 150,000	
March 31, 1952	42,657,848	1,772,136
March 31, 1953	54,632,976	1,753,651
March 31, 1954	44,114,825	2,008,321
March 31, 1955	39,186,095	1,637,787
March 31, 1956	56,996,682	930,879
		2,023,070
April-June Quarter	14,752,299	540,156
July - Sept. Quarter	13,172,110	641,090
Total Six Months	27,924,409	1,181,246
October 1956	4,505,518	196,214
Total Seven Months	32,429,927	1,377,460
November (Estimated)	4,255,000	185,000
December (Estimated)	4,400,000	180,000
Total Third Quarter (Est.)	13,160,518	561,214
Total Nine Months (Est.)	\$ 41,084,927	\$ 1,742,460

[Vol. 5167]

ROME CABLE CORPORATION

Sales for the current quarter should run approximately the same as for the last quarter but earnings may be off as much as 15 per cent, or about \$80,000. Sales will run more than 10 per cent behind the same period a year ago.

SALES AND ORDERS

The breakdown of sales before deduction for discount and freight from April to November, with November 1956 figures estimated, are as follows:

	April - November* 1956	April-November 1955	% Increase or (Decrease)
Rods	\$ 3,917,000	\$ 4,270,046	(8.3)
Bare	5,965,000	6,182,107	(3.5)
Weatherproof	1,772,000	2,294,556	(27.7)
Magnet	2,572,000	2,486,256	3.4
Rubber Covered	15,834,000	14,011,423	13.0
Torrance-E. M. T.	2,356,000	1,999,051	17.9
Rigid	2,489,000	1,801,906	38.1
Spiral 4	-	1,229,700	-
Aluminum	3,635,000	2,695,544	34.9
	\$ 38,540,000	\$ 36,970,589	4.2

* November 1956 estimated.

On the basis of present indications our dollar value of sales for the current fiscal year will run about 3 per cent behind a year ago.

During the first seven months of our fiscal year quantity of incoming orders for copper products declined 10 per cent below the period of a year ago, while Aluminum and Torrance increased approximately 30 per cent. On the basis of dollar value the total was about in balance for the two periods.

BACKLOG OF ORDERS

January 6, 1956	Rome - Copper Products	\$ 5,162,000
	Aluminum	907,000
	Spiral 4	463,000
	Torrance - E. M. T.	271,000
	Rigid	479,000
		\$ 7,282,000
June 30, 1956	Rome - Copper Products	\$ 4,153,000
	Aluminum	894,000
	Spiral 4	-
	Torrance - E. M. T.	189,000
	Rigid	76,000
		\$ 5,312,000

[fol. 5168]

ROME CABLE CORPORATION**BACKLOG OF ORDERS - Cont'd**

Nov. 1, 1956	Rome - Copper Products	\$ 3,122,000
	Aluminum	1,017,000
	Spiral 4	-
	Torrance - E. M. T.	47,000
	Rigid	206,000
		<u>\$ 4,392,000</u>

You will note from the three above periods the steady decline in backlog in Rome Copper Products and increase in aluminum backlog. There is little question but the weakness in the price of copper and greater availability that has developed during the year, which has influenced our customers to liquidate inventories, has materially affected our backlog.

COPPER

Since the September 5th meeting the producers have reduced the price of copper from 40 cents to 36 cents per pound. Although improving demand continues less than copper production, we believe there will be a determined effort to maintain the 36 cent level unless foreign consumption is adversely affected by oil rationing. At the start of 1956 the custom smelters were charging seven cents a pound premium over the producer figure of 43 cents. In November for the first time in many months there has been one quotation for domestic copper. With an ample supply of metal available we feel it expedient to keep our copper purchasing at a minimum.

ALUMINUM

As with copper we are being offered more aluminum than we require. We now have three sources supplying us each quarter with a fourth, Reynolds Metals, showing the first definite interest in shipping on a monthly schedule. Even though the aluminum companies foresee a tightening supply next summer, we believe our stocks should be ample for presently projected needs.

STEEL

Keeping a balanced inventory of sheet steel has confronted us with a serious problem. Cold rolled steel, required for E. M. T. has been plentiful, but the scarcity of hot rolled sheets for Rigid has resulted in an unbalanced inventory at the present. With the longshoremen back at work we expect, however, to have sufficient hot rolled steel next quarter.

[fol. 5169]

ROME CABLE CORPORATION**PAYROLL STATISTICS**

	<u>Week Ending</u>	<u>No. Employees</u>	<u>Total Payroll</u>	<u>Avg. Wkly. Wage</u>	<u>Avg. Hrs. Pr/Wk.</u>	<u>No. Salaried Employees</u>
<u>ROME</u>	12/11/55	M 882 F 38 920	\$ 93,823.58	\$ 101.98	46.1	418
	6/17/56	M 903 F 23 927	87,996.85	94.93	43.8	440
	11/18/56	M 880 F 29 909	91,962.83	101.17	45.2	450
<u>TORRANCE</u>	12/10/55	134	\$ 13,603.50	\$ 101.08	41.8	48
	7/21/56	141	12,953.25	96.50	39.7	47
	11/10/56	140	13,930.46	100.70	41.1	47

You will note from a year ago the number of Hourly workers has declined but the number of salaried employees has increased by 8 per cent. Some of this can be accounted for in new students and expanded departments, in line with my recommendations of last year. However, I feel that some study should be made towards bettering the relationship of hourly to salaried workers.

LABOR

Labor relations at Rome are excellent. On November 8th the Torrance plant voted to have the United Steel Workers as their bargaining agent by a vote of 80 to 50. This was a distinct surprise and perhaps we were too complacent and over confident about the results. Negotiations for the first contract will probably not be completed for two months or more. I am told that notwithstanding the election Torrance reports good labor effectiveness.

INVENTORIES

Our inventories are at the highest level we ever had and are 55 per cent higher than a year ago. We have had Ernst & Ernst studying our consigned and warehouse inventory control and are embarking on a program which should reduce our inventories by at least a million dollars before the end of our fiscal year, which monies can be used to good advantage in the paying off of our short term loans of \$1,000,000.

[fol. 5170]

ROME CABLE CORPORATION**DIVIDENDS**

I recommend payment of dividend No. 71 at the rate of .35 cents per share to share owners of record December 14, payable January 4, 1957. I also recommend payment of cash dividend to employees on the same date at 17-1/2 cents per participating unit, and that a contribution of an additional one-third of that amount be added to the Rome Cable Employee Profit-Sharing Trust Fund.

At our September meeting we discussed the possibility of declaring a 5 per cent stock dividend on the basis of current and expected earnings. I recommend the declaration of a 5 per cent stock dividend to share owners of record December 14 and that distribution be made on January 4, 1957.

EXECUTIVE BONUS

It has been customary at this meeting of the Board to make a first or second payment for the current year on the Executive Bonus. Inasmuch as there has been no payment made to date I recommend approval of disbursement of \$175,000 to those members, and in the percentages authorized, at the June Board meeting.

CHRISTMAS GIFT

I recommend that \$5.00 be given at Christmas, as usual, to all employees excluding Directors.

PENSION PLAN

We have sixty-two former employees receiving pension or disability benefits under our Retirement Income Plan. In our first year we paid \$121,000 to the Insurance Company and \$326,000 to J. P. Morgan & Co. Incorporated, Supplementary Trustee. On July 26th we advanced \$100,000 to Massachusetts Mutual for current payments. Our insurance advisor suggests that a minimum of \$147,000 be paid to the Insurance Company to take care of estimated withdrawals in the ten year period. With the current low yield of securities and the fact that our Supplementary Trusteed Fund as of November 21st shows an appreciation of 2 per cent we might want to have some discussion towards placing a more sizable amount with the Insurance Company in the current year, inasmuch as their interest rate equals that of the Trusteed Fund. This would, of course, enable us at some time in the future to reduce our payments to the Insurance Fund and contra-wise increase our payments to the Supplementary Trusteed Fund, if conditions were more favorable so to do. I would like to have some discussion on this subject at the meeting.

[fol. 5171]

ROME CABLE CORPORATION**PROFIT-SHARING FUND**

The Profit Sharing Plan recently received Treasury Department approval. The Market value on November 21, 1956 was \$78,160 compared to book value of \$71,708. The yield at book value on the investment is 3.95 per cent.

ROME CABLE FOUNDATION

At this meeting it has been customary to take a preliminary look at the amount to be contributed to Rome Cable Foundation. We actually donated \$7,582 last year. I recommend that consideration be given for between \$75,000 and \$100,000 for the current year. As a means of saving cash I would recommend that 1000 shares of Treasury stock be authorized for transfer at this meeting and an additional cash contribution of \$16,000 be made as the initial one for the current year. We can then look at the situation at our March meeting on what to do about the balance.

RESEARCH & DEVELOPMENT

At the last two meetings of the Board we had considerable discussion regarding the need for addition to the office and the building of a new laboratory. Capital authorizations were made with request for further investigation but both projects were held up.

We have had many discussions and urge reconsideration of the laboratory program. Mr. Schatzel for some time has been recommending the strengthening of the organization of our laboratory to better serve our needs. At the moment research is the smallest portion of our research, engineering and development budget. Principle duty has been plant and customer engineering service. We have reached a point in size and program where additional expenditures for organization, equipment and facilities are necessary if we are going to keep abreast of the potential growth of our industry in the years ahead. Meeting the challenge of the atomic and electronic age, plus the many new materials coming from the chemical industry, as well as stepping up our true research on many that we now have further emphasizes the need for this step. Ross Fraser's trip to many wire companies in Europe where their facilities and expenditures for research in many instances dwarf ours indicate that dollars invested at this time in the expansion of our research program at Rome Cable will be one of the best items of insurance for our future.

As a personal note. Our present Director of Research and Engineering indicates he will reach retirement age in about four years and it is not his intention to serve in his present capacity beyond a year longer than that. It therefore seems imperative to me that we give him the facilities and the budget to realize the full benefit of his recommendations within the five year period. I estimate that the building and land will cost approximately \$350,000. At this meeting, however, we are merely looking at the approval of the idea of going ahead. The actual details of the program will be prepared in greater detail by Mr. Schatzel and also by our Plant Engineering staff.

I believe that a new laboratory will require probably an additional \$100,000 worth of new equipment and that we might be looking at an increased expenditure for research of about \$200,000 per year at the end of five years. This would still keep

[fol. 5172]

ROME CABLE CORPORATION**RESEARCH & DEVELOPMENT - Cont'd.**

our percentage for research considerably below the electrical industry.

CAPITAL EXPENDITURES

Our total cash outlay for capital expenditures in the current fiscal year will approximate our total depreciation, or a total of about \$850,000. We will have a carryover into the new fiscal year of appropriations totalling about \$250,000.

The Executive Committee has had several meetings reviewing potential authorizations for the fiscal year 1957. At this time in addition to the carry-over and the potential \$350,000 for laboratory I believe that we should informally authorize another \$500,000, the use for which can be supported by Mr. Ellis for discussion at the meeting. The original tentative list prepared by the Manufacturing Department, which includes a complete enameling plant exceeded four million dollars.

In the last quarter we have carefully studied the needs for enameling and believe that for the present an additional expenditure of \$65,000 will provide us adequate capacity on flats and squares and round sizes up to approximately size 20. We also decided not to provide additional equipment for production of ACSR at the Rome location.

PUBLIC RELATIONS

For some time we have been anxious to improve or organize our public relations along better lines. Our Advertising Agency - Charles L. Rumrill & Co. Incorporated have recently added a Public Relations Department and in conjunction with our Advertising Department they have outlined a program for better product, corporate, local, regional and national publicity at a fee of \$9,000 per year, plus expenses estimated to run from \$2,000 to \$5,000. We have listened to the outline of the program and heartily recommend its adoption.

TEN YEAR DINNER

Our eleventh ten year dinner was held in the cafeteria Tuesday night, November 27th, with seventy-two new ten year members being added this year. We now have nearly half of our employees having ten years or more service, for which we are very proud.

STUDENT RECRUITING

In June we added Milo Eames to our staff to assist Mr. Schatzel in handling our Student Course, Scholarship program, recruiting of students and overall direction of educational activities in the Company. He is currently visiting the colleges with a well planned program to interest them in Rome Cable. Last year we were unable to get any engineers at all. Our program for the current year calls for three electrical engineers, two mechanical engineers and one chemical engineer. We will likewise not be passing up any opportunities for good prospects who are not engineers.

[Vol. 5173]

ROME CABLE CORPORATION**NEW YORK STOCK EXCHANGE**

Our number of stockholders is increasing and we should in the near future reexamine the possibility of listing on the New York Stock Exchange.

REVIEW OF CURRENT YEAR'S PROGRAM AND THE FUTURE

At the meeting a year ago I outlined a series of problems and urged the adoption of an aggressive and more definite approach toward the attainment of our goals. In the current calendar year we have accomplished a great deal along certain lines but there remains still many unsettled problems. Organization-wise we have strengthened the Finance Department and look for that department to take over certain responsibilities presently covered by the Comptroller's Department in the matter of salary administration, pension, insurance, etc. Our Sales reorganization is working smoothly and we have strengthened our Advertising Department, and we have increased the responsibility of many of our younger people in the organization, but there is still much to do in this connection.

On the list of new product additions mentioned a year ago the only definite addition is plans for rectangular and heavy round enamel magnet wire, which will be available some time in mid-1957. We have seen the encouraging results attained when Torrance has an adequate load and the importance of supplementing or augmenting its product line should prove profitable, unless the recent decision to unionize should make the climate or cost unreasonable. We all still appreciate the wisdom of greater diversification of product.

For years we have seen the addition of many new materials for insulation in the development of new products, which in itself has expanded our line, but has also made many uneconomical and unprofitable runs to keep so many items in the line. A realistic appraisal on the basis of market and profitability could well pay big dividends at what we believe slight sacrifice in volume and provide better service to customers.

With the almost fantastic predictions of growth for the electrical industry in the next ten to twenty years we must take more definite steps towards examining and appraising the possibilities of other locations. Our several efforts to acquire or merge with certain other companies, on the basis of expanding our product line and improving our distribution points, have so far met with no success. We continue to have approaches made by larger companies and have listened to their story but our executives still feel that the control of our own destiny will be a happier course. I likewise feel that by taking full advantage of the combined knowledge and reputation of our organization that the financial returns from such a course will prove its merit.

Ross Fraser spent some time in Europe visiting various wire companies in England, Germany, Switzerland, France and Italy. He came back much impressed with the progress of many of these companies in the field of new products, improved equipment design, manufacturing techniques and advanced research. He advises that we have an open door with some of the very progressive companies for a liaison and interchange of technical research information. He feels it is imperative that in planning any equipment program on keeping us up-to-date that some of the European developments should be

[fol. 5174]-

RÔME CABLE CORPORATION

REVIEW OF CURRENT YEAR'S PROGRAM AND THE FUTURE - Cont'd.

checked by our people on the scene. He also urges near-term visits by research and engineering.

Respectfully submitted,

H. T. Dyett, Chairman of the Board

[Vol. 5175]

E.P.'s approved since our last meeting:

<u>RDG</u>	<u>E.P. No.</u>	<u>Description</u>	<u>Amount</u>
	1802	Purchase a circular unit	\$ 3,800
	1803	Purchase measuring machine and base	250
	1804	Purchase and install 1 wire heavy round and rectangle wire enamel unit	85,000
	1805	Appropriation for second half P.Y. covering Furniture and Fixtures	11,000
	1806	Purchase and erect materials and labor to extend Building #24	11,500
	1807	Purchase and install portable vacuum cleaner	1,200
	1808	Purchase and install a Wallace 75 VS Control	8,200
	1809	Purchase and install near test tanks in Bldg. #20 a suspension type scale for weighing large reels	1,500
	1810	Purchase and install electric hoist for lifting compound to C.V. messahine	1,200
	1811	Purchase and install new time clocks and master clock	7,000
	1812	Purchase a subzero constant temperature cabinet with one set of mandrels	900
	1813	Capitalise the cost of labor and materials supplied to enlarge the southerly C.V. messahine and add an additional flight of steel stairs therefrom	10,000
	1814	Purchase and install a 500# capacity dial scale in plastic mixing department	800
	1815	Purchase and install Drummond Microhamatocrit and Drummond Hematocrit Reader	250
	1816	Purchase and install Westinghouse Water Cooler	200
			\$42,800

[fol. 5176]

<u>E.R. No.</u>	<u>Description</u>	<u>Amount</u>
<u>TONNAGE</u>		
C-269	Purchase 1 McKinley Type D Portable Mechanical Shear	\$ 255
C-270	Purchase 1 - 7000 lb. capacity Clark "Millitrac" fork lift	7,515
C-271	Install 2" Black pipe by-pass line from Propane Surge Tank to Boiler House	352
C-272	Install Service Recorders for Tube Mills and Chafers	1,188
C-273	Purchase one Deall Contour Bandsawing, filing and polishing machine	2,536
		<u>\$11,846</u>

Additional E.R.'s approved:

1718-A	Additional appropriation on takeups on C.V.'s	\$ 2,500
1744-A	Additional for installing 6" C.V. unit with drive, and two 72" payoffs and takeups	14,000
1799-A	Additional for four cylindrical steel tanks	2,600
1639-A	Over-expenditure on large dome type vulcaniser	5,900
1741-B	Over-expenditure on two aluminum casting and rolling units	715
1745-A	Additional on installation of 6" plastic covering unit	1,300
1769-A	Additional on 100 HP V S drive for the 6" pan tubin machine	500
1784-A	Over-expenditure on 13 window type air conditioning units in office mezzanine in Bldg. #20	715
1795-A	Additional on 4 air conditioning units in the Engineering Dept., Bldg. #15	395
		<u>\$28,625</u>

[fol. 5177] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 128

**ROME CABLE
CORPORATION****ROME, N.Y.****REPORT SUBMITTED TO THE BOARD OF DIRECTORS
OF ROME CABLE CORPORATION AT THEIR MEETING
MARCH 7, 1957**

I present record of sales and earnings after taxes by fiscal years from 1937 to date, and by quarters for the current year, the month of January and estimates for February and March:

<u>Fiscal Year Ended</u>	<u>Net Sales</u>	<u>Earnings</u>
March 31, 1937	\$ 1,798,092	\$ 1,616
March 31, 1938	4,957,103	71,027
March 31, 1939	5,370,665	245,036
March 31, 1940	6,080,982	297,736
March 31, 1941	9,465,451	431,501
March 31, 1942	11,631,785	592,135
March 31, 1943	12,712,333	367,654
March 31, 1944	16,909,735	466,709
March 31, 1945	22,798,218	486,653
March 31, 1946	16,975,009	398,973
March 31, 1947	18,436,305	1,359,593
March 31, 1948	25,202,853	1,152,579
March 31, 1949	26,088,523	1,115,960
March 31, 1950	19,602,984	302,209)
		150,000)
		452,209)
March 31, 1951	35,142,901	
	Net	
	Minus:	\$ 1,922,136
	Transfer to copper reserve	150,000
March 31, 1952	42,657,848	1,772,136
March 31, 1953	54,632,976	1,753,651
March 31, 1954	44,114,825	2,008,321
March 31, 1955	39,186,095	1,637,787
March 31, 1956	56,996,682	930,879
		2,023,070
April - June Quarter	14,752,299	540,156
July-Sept. Quarter	13,172,110	641,090
Oct.-Dec. Quarter	12,724,365	535,399
Total Nine Months	40,648,774	1,716,645
January 1957	4,298,930	163,376
February (Est.)	3,186,000	54,000
March (Est.)	3,849,000	152,000
Tot. Fiscal Yr. (Est)	\$ 51,982,704	\$ 2,086,021

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ROME CABLE CORPORATION

Sales for the current quarter will run 10% lower than the period October to December and 29% lower than the same quarter a year ago. The reduction in overall quantity would be about five points less in each case, the difference being caused by sizable copper price reductions from the two earlier periods. Profits for the fiscal quarter are estimated at \$369,000, of which approximately \$100,000 will come from Torrance. Estimated profits for the fiscal quarter have been most difficult to estimate because of continuing drop in copper price, which has created a gross loss of \$187,000 if copper stays at 32 cents plus inventory gross loss of about \$110,000 from the prior year. This represents an over-statement of about \$50,000 net in prior year's profits. While the total estimated profits of \$2,086,000 will exceed the prior year the per share earnings will be down from \$3.82 to \$3.74, owing to larger number of shares outstanding in current period, owing to stock dividend. Extraordinary and we hope non-recurring charges approximated \$500,000 charged against current fiscal year.

SALES AND ORDERS

The breakdown of sales before deduction for discount and freight from April to February, with February estimated, are as follows:

	April 1956 Feb. 1957	April 1955 Feb. 1956	% Increase or (Decrease)
Rods	\$ 5,486,000	\$ 7,019,000	(21.8)
Bare	7,545,000	9,395,000	(19.7)
Weatherproof	2,332,000	2,982,000	(21.8)
Magnet	3,454,000	3,652,000	(5.4)
Rubber Covered	20,797,000	19,832,000	4.9
Torrance - E. M. T.	2,950,000	2,658,000	11.0
Rigid	3,352,000	2,283,000	46.8
Spiral 4	-	1,691,000	-
Aluminum	5,061,000	4,147,000	22.0
	\$ 50,977,000	\$ 53,659,000	(5.0)

Sales estimate for the current fiscal year will be off about 8% from the prior year, although we actually had about equal quantity with the prior year in Rome, and Torrance quantity was 21% ahead of a year ago.

Incoming orders for the eleven months of the fiscal year on a quantity basis are off 5% from the same period a year ago, and the first two calendar months are off 20% from the same two months a year ago.

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ROME CABLE CORPORATION**BACKLOG OF ORDERS**

		<u>Value</u>
February 8, 1957	Rome - Copper Products	\$ 2,897,000
	Aluminum	513,000
	Torrance- E. M. T.	48,000
	Rigid	177,000
		\$ 3,635,000
August 31, 1956	Rome - Copper Products	\$ 3,654,000
	Aluminum	1,083,000
	Torrance- E. M. T. & TV Mast.	345,000
	Rigid	474,000
		\$ 5,576,000
February 10, 1956	Rome - Copper Products	\$ 5,304,400
	Aluminum	815,000
	Torrance - E. M. T. & TV Mast	428,000
	Rigid	766,000
		\$ 7,313,400

Our backlog shows a drastic decline from the two prior periods shown above. Aluminum decline comes from ALCOA now making most of their own plastic. Other Rome product declines are due to lower prices and hand-to-mouth buying in a lower copper market.

COPPER

Producers price for copper has been reduced another 4 cents per pound since the last meeting and smelters and world price is between 1 and 2 cents per pound lower than that. The January statistics were up appreciably from December but sentiment seems to indicate that most people are looking for a 30 cents per pound price. At 32 cents per pound this means a reduction of 23 cents per pound from the world price prevailing at the end of our last fiscal year, which in actual cents per pound is the largest in modern times.

ALUMINUM

Aluminum is in plentiful supply and all the major producers are now anxious to sell us. While our budget for the new fiscal year shows an appreciable increase over fiscal year 1956 our monthly intake will be reduced from the recent levels when we were trying to get a more satisfactory inventory on hand.

STEEL

We have been working on reduction of our cold rolled steel inventory and believe our commitments and inventory will soon be in better balance with our production.

[fol. 5180]

ROME CABLE CORPORATION

PAYROLL STATISTICS

Our factory payroll covering number of employees, weekly payroll, average weekly wage and average hours worked for a period a year ago, six months ago and the last week available, as well as the number of monthly salaried workers for both Rome and Torrance are shown below:

	<u>Week Ended</u>	<u>No. Employees</u>	<u>Total Payroll</u>	<u>Avg. Wkly. Wage</u>	<u>Avg. Hrs. Worked</u>	<u>No. Salaried</u>
<u>ROME</u>						
	2/19/56	M 894 F 33 927	\$ 97,844.69	\$105.55	47.0	422
	8/19/56	M 872 F 31 903	\$ 91,225.32	\$101.02	45.3	448
	2/24/57	M 801 F 24 825	\$ 70,580.79	\$ 85.55	38.9	457
<u>Torrance</u>						
	2/18/56	131	\$ 12,409.41	\$ 94.73	40.2	44
	8/18/56	129	\$ 13,844.66	\$107.32	43.1	47
	2/16/57	135	\$ 13,830.40	\$102.45	40.4	48

There was a drop in Rome hourly employees of approximately 100 from a year ago. Half is caused by temporary layoffs due to reduced volume and inventory liquidation in February but the other half of the layoffs has been projected as efficiencies and savings from the start of indirect incentive plan in January 1957. Practically all of the increase in salaried workers represents change from indirect hourly to salaried method of payment and does not represent increased cost.

LABOR

Due to area and national competitive labor agreements we granted an approximately 5 cents per hour increase to all Rome plant employees on December 17, 1956, with an additional 7 cents in December 1957 and December 1958. This was accepted by IAM representing maintenance workers in the Rome plant. At the same time we announced an incentive plan for indirect workers effective January 1957.

{fol. 5181}

ROME CABLE CORPORATION**LABOR - Cont'd**

On February 18th we signed a contract with U.S. Steelworkers representing Torrance production employees granting approximately the same increase to them, but only for the year 1957, with contract expiring in December of 1957. We agreed to investigate the possibility of indirect incentives at Torrance also. On this basis Rome should have clear sailing for approximately three years and we hope that the Torrance plant can negotiate their contracts in conformity with Rome.

It is distinctly evident that we are getting higher production with less manpower.

In January we offered free polio shots to all employees stationed at Rome on a voluntary basis. About 150 over age 40 indicated, in response to our questionnaire, that they did not wish to have them. The reception otherwise was excellent. We are making the same offer to our Torrance employees this month.

INVENTORIES

Projected inventory reduction of over one million dollars in the current quarter will be realized by March 31st. While our present policy of expanded consigned stocks and heavier finished stocks to provide better service to customers will mean our carrying somewhat higher inventories than will show at the end of the year we believe it good policy to eliminate the band of 40 cents copper before March 31st.

WORKING CAPITAL

Our working capital should show an increase of over one million dollars over the previous year. We will pay off our \$1,000,000 of short-term loan before the end of the year and will have reduced our long-term debt by \$460,000 in the current year.

PRICES

Prices for all poundage products have been reduced with each producers' reduction in price of copper. Reduced volume in insulated products accelerated competitive granting of additional discounts. Some of the worst offenders with extensive discounts have recently published new policies, which, if followed and considering copper cost reduction, should bring margins more nearly in line with December and early January levels.

Our prices for Rigid Conduit are being increased this week to reflect recent increased steel and labor costs.

RENEGOTIATION

We have agreed with the New York Renegotiation Board covering fiscal year ended March 31, 1953, net cash affect of which is approximately \$52,000, for which we had ample provision in our tax reserve. This determination was somewhat higher than we had hoped. Mr. Sarles was successful in having them agree to consider to handle the years 1954 and 1955 jointly, so that we should be able to include termination expenses in 1955 and 1956 to offset what they may consider excessive profits in 1954. We believe our reserve should

[fol. 5182]

ROME CABLE CORPORATION**RENEGOTIATION - Cont'd.**

cover their determinations. It must be remembered that we still have to clear Washington on the above findings.

TAX REFUND

The Internal Revenue Code for 1954 presented an opportunity for a different handling of property taxes. Working with our accountants, Ernst & Ernst, our Comptroller's Department has filed claims for refund covering fiscal years back to March 31, 1952 which in the aggregate should give us a refund of \$109,198 plus approximately \$30,000 in interest. Local representative has approved the refund and it remains now to get further executive action from the Bureau.

DIVIDENDS

I recommend payment of Dividend No. 72 at the rate of 35 cents per share to share owners of record March 18th, payable March 28, 1957. I also recommend payment of cash dividend to employees on the same date at 17-1/2 cents per participating unit, and that a contribution of an additional one-third of that amount be added to the Rome Cable Employee Profit-Sharing Trust Fund.

A 5 per cent stock dividend to share owners of record December 14, 1956 was distributed on January 4, 1957.

EXECUTIVE BONUS

We made payment of \$175,000 on current year executive bonus in November. On the basis of projected earnings I recommend approval of an additional disbursement of \$125,000 to those members and in the percentages authorized at the last June Board Meeting.

PROFIT-SHARING TRUST

As of the first of March the Profit-Sharing Trust has a book value of \$83,800, market value \$91,400 or an appreciation of 9%. It has a yield on book value of 4.76%. Approximately \$14,000 more will be added to the fund on March 28th.

PENSION

On March 1st we had 409 employees covered by Pension Plan started in 1944 with Bankers Life Company of Iowa. As of now 11 employees are currently receiving pensions under this Plan.

Under the Pension Plan started August 1, 1955 we now have 62 people drawing pensions. We have paid Massachusetts Mutual \$147,000 which completes our commitment for the current year. We are getting 3.75% interest on this money. In the Trust handled by J.P. Morgan & Co. Incorporated we have securities with a book and market value of \$334,000, with a current yield of 4.08%. I believe we should accrue \$300,000 for payment to the bank trust fund some time prior to June 15th, which is in keeping with our plan inaugurated last year to get maximum tax amortization and clear up back service payments in eleven years.

[fol. 5183]

ROME CABLE CORPORATION**ROME CABLE FOUNDATION, INC.**

At the last Directors' Meeting we voted Rome Cable stock and cash in amount of \$40,000 to the Foundation. An additional \$35,000 will have been accrued by March 31st on our books. I recommend that at least this \$35,000 be given with possible consideration for an added contribution.

As of March 1st the Foundation had assets having a market value of \$285,000 with an estimated annual income of \$12,000. Expected disbursements before the end of their fiscal year will total \$6500. and preliminary budget for the new year will total \$40,000.

SALES BUDGET FOR FISCAL YEAR 1957

In accordance with past practice we have prepared an estimated sales budget for the fiscal year starting April 1, 1957. This shows total dollar expectancy of \$53,000,000, which is up about 2% from the current year. Overall quantity increase, however, is expected to show an increase of 7%. We are expecting profits, however, to show an increase of 14%.

CAPITAL EXPENDITURES

Total capital expenditures for the current fiscal year will approximate \$800,000. Sale of one of the Proprietary units and other sales reduced cash outlay by approximately \$100,000, compared with depreciation and amortisation for the year of \$768,000. We charged operations with sale of \$67,000 of obsolete equipment. Disposals of other fully depreciated or obsolete equipment will bring gross additions therefore to approximately \$500,000.

At the last meeting we informally approved \$500,000 for Rome and Torrance, exclusive of the new laboratory. Their new requests for the next year total \$482,000 for Rome and \$90,000 for Torrance with a carry-over of \$400,000 from prior year approvals. This would bring total carry-over and requests to \$972,000, of which it is estimated approximately \$250,000 would be carried as a cash cost to fiscal 1958. With an expected cost of \$425,000 for the laboratory this would mean potential cash needs of approximately \$1,150,000 which deserves considerable discussion in the light of the above sales budget and estimated profits for the new fiscal year. It also points up the importance of consideration of possible other means for financing research and development laboratory, as will be discussed later.

On the basis of the above figures I recommend that we give Rome approval for \$250,000 and Torrance for \$50,000, with a further review in the light of conditions at our May and/or June Directors' Meetings.

The original 1955 plant rearrangement program is reasonably complete, with the exception of receiving department and basement operations of synthetic extrusion. New plastic mixing was put in operation during the current quarter with excellent results and is operating at a \$50,000 per year saving. Major items still to be delivered in

[fol. 5184]

ROME CABLE CORPORATION**CAPITAL EXPENDITURES - Cont'd.**

1955-56 program are bull block and enameling machine. We expect the bull block to be in operation by June 1957 and the enameling equipment by May 1957.

ADVERTISING BUDGET

In the current year it is expected that we will have spent approximately \$240,000 for advertising against a budget of \$262,000. Our Sales Department with our Agents and Advertising Dept. proposed a budget for the new year of \$340,000 which total figure has been incorporated in our total expense budget for the new year. Cost of space has increased \$32,000 alone. A sizable amount of the increased budget comes in the field of public relations, on which expenditures cannot be made until the latter part of the year. I therefore recommend that we approve a budget of \$275,000 for the new year and consider how much additional we may want to give them at the June Board meeting. I am well pleased with the full program as submitted and hope we can give full approval at the June meeting.

RESEARCH & DEVELOPMENT

At the last meeting we tentatively approved the sum of \$350,000 for the construction of a new laboratory. Since that time we have engaged the firm of Charles Butler & Associates to act as architects and consultants with our organization. There is on view here today an artist's conception of the proposed building, which has pleased all of us who have seen it.

Preliminary estimates indicate the cost will run approximately \$425,000 for approximately 26,000 sq. ft. of floor space, 7000 ft. of which is in the basement the larger part of which will be for pilot plant purposes. I recommend tentative approval of the revised estimate of \$425,000, pending actual bids. If we can act promptly completion should be sometime in November.

For some time past our Secretary has been checking with our counsel and auditors on possibility of financing the new laboratory, either through the Foundation and Pension Trust or Foundation and some other financing agency, such as an insurance company, on security of a long-term lease of the property to Rome Cable Corporation. A special report will be presented to the meeting outlining all of the details and I hope we can have a full discussion at the meeting and determine on a program of procedure.

In connection with the new laboratory we must pursue vigorously the reclassification of present personnel and secure three top men in the fields that Dr. Schatzel needs to start his new program.

[fol. 5185]

ROME CABLE CORPORATION**ORGANIZATIONAL CHANGES**

Since Stuart Barrett's death the Comptroller's Department assumed responsibility for much of his work. In the interest of good organization and because of the rapidly expanding work involved in some of the fields it was determined that such items as taxes, pensions, employee dividends, profit-sharing trust, stock purchase plan, salary administration, insurance and Foundation matters should properly come under the Treasurer's jurisdiction. Therefore, effective March 1st Donald R. Fraser, Assistant Comptroller, with several other employees previously handling the above programs were transferred to the Treasurer's department. This will relieve our Comptroller's Department of considerable detail and also place the above functions where they more properly belong in the Treasurer's department.

NEW YORK STOCK EXCHANGE

In the belief that we now have the proper qualifications I recommend we pursue the matter of listing on the New York Stock Exchange some time after the issuance of our next annual report.

T. J. COPE, INC.

In December there was called to our attention that a company by the name of T. J. Cope, Inc. manufacturers of cable accessories, troughs and racks, was for sale. Since that time we have had several of our officials meet with their people and expect to have some figures to review at the meeting on Thursday. The principal owner has died and the company is now being run by trustees who are anxious to sell. Our sales, engineering and manufacturing people speak well of this company's reputation and their organization.

We had a meeting with one of the Trustees, who is also their auditor, the son of the former owner, and the General Manager on Wednesday, March 6th, reviewing their financial figures and discussing policies and methods of operation, which will be reported on for discussion and action at the meeting.

B. F. GOODRICH CO.

Earlier in the year we received a report from B. F. Goodrich Co. covering a new type of conduit made with Geon. We understand that we are the only conduit manufacturer to which they have brought this detailed report. We all felt it had enough interest to cause us to have certain tests run at Torrance and Rome, and certain investigations made with the Underwriters and checks on the cost data furnished. This might prove an interesting product addition to Torrance, where we feel increased load would produce excellent returns.

[fol. 5186]

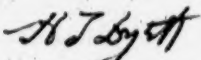
ROME CABLE CORPORATION

GENERAL

The final quarter of the current fiscal year will be disappointing from an earnings and sales volume standpoint. However, elsewhere in the report is the projected level of operations for the new fiscal year which we feel is reasonable of attainment despite the current situation.

We continue to receive inquiries as to our willingness to sell or diversify, or expand, in other directions and all of such inquiries of merit are carefully checked and appraised by our staff. Certain announcements, and some rumored acquisition of presently operated units in the wire industry by large aluminum and copper producing units are naturally going to affect our industry and must be carefully appraised. We still believe that our ideal method of expansion would be acquisition or merger with other strong independents to broaden our line.

Respectfully submitted,



H. T. Dyck, Chairman of the Board



[Vol. 5187]

E.R.'s approved since last meeting of the Board (Mo. our 29, 1956):

<u>ROME</u>	<u>E.R. No.</u>	<u>Description</u>	<u>Amount</u>
	1796	Materials and labor to construct building between Bldgs. 1 and 12	\$35,000
	1817	Purchase and install one metal enclosed 2300 volt gang operated three pole lead break switch for installation on power mainline in Bldg. #20	2,500
	1818	Purchase and install a three stand flat rolling machine with necessary edging rolls and two takeups	50,000
	1819	Supply materials and labor to construct an enclosed stairwell in Bldg. 16	10,000
	1820	Purchase a Model 1938 Addressograph Machine	3,200
	1821	Purchase one Executive Electric Battery Runabout	1,000
	1822	Purchase Clark Telescopic Fork Lift Truck	7,150
	1823	Purchase 4-wheel drive Jeep	2,550
	1824	Purchase one Model Multigraph Duplicator	2,050
	1825	Purchase equipment from Army Signal Corps Supply Agency now in our plant and formerly used in Spiral Four Production	2,090
	1826	Purchase and install an electrically heated oven for cleaning extrusion tools	1,000
	1827	Purchase and install 42" telephone cable twister	45,000
	1828	Purchase and install two 20" Cord Twisters	30,000
	1829	Purchase and install traversing reel takeup	7,500
	1830	Purchase and install semi-automatic welder	7,500
	1831	Purchase portable 500# capacity floor scale	900
	1832	Purchase a small Universal Grinder	8,500
	1833	Purchase one Weber electric vacuum oven	400
	1834	Purchase an ice storage cabinet	240
	1835	Purchase 1 Model 3038-T Mettler B-5 Analytical Balance	5,980
			<hr/> \$222,500

[Vol. 5188]

<u>E.R. No.</u>	<u>Description</u>	<u>Amount</u>	
<u>TORRANCE</u>			
C-274	Purchase 2 Modern Cut-off machines	\$ 1,890	
C-275	Purchase Automatic Marking Machines, Extra Reservoirs and Recording Dis Hells	13,400	
C-276	Purchase material and fabricate thread brushing machine for Hot Dip.	7,213	\$22,503

Additional E.R.'s approved:

<u>E.R. No.</u>	<u>Description</u>	<u>Amount</u>	
<u>ROME</u>			
1741-C	Over-expenditure, charged to Misc. Account of Plant Engineering and Maintenance	\$ 5,120	
1799-B	Additional appropriation steel tanks	6,000	
1790-A	Additional on construction of addition to Bldg. #20	5,920	\$17,040

<u>TORRANCE</u>			
C-271A	Additional costs to installation of 2" black pipe By-Pass Line from Propane Tank to Boiler House	\$ 330	\$ 330

[fol. 5189] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 129

Confidential

A. D. B. Fraser & H. T. Dyett

J. H. Dyett

March 11, 1957

Revere

Dear Ross and Dad:

This afternoon Rudy, Charlie and I had discussions with Louis Glesmann, Harold Wilson and Ed Barnard on the subject of buying aluminum pig from them.

Olin-Revere expects to be in production in late 1957, but Revere is anxious to make lasting connections with several outlets prior to that time. Evidently they have aluminum on contract from other sources which they can spare until such time as their own Ohio property is ready to deliver which would be some time in the first half of 1958 with full production in late 1958. G.C.C. evidently is trying a new Kaiser aluminum specification pig shortly, and we should get the results of this run. We are also expecting to get 100,000 of this new material.

They made it quite plain that they had been quite worried about policies of the integrated companies. I said that this had been also foremost in our minds and that integration was a very serious problem to the independents. They stated Revere did not expect to go into the wire business. There was no indication that they had heard the rumors which we have, but it is probably natural that they wouldn't divulge anything.

One very important thing that came out of the meeting was that Olin-Revere was being set up as a non-profit organization and that Revere would receive its metal at cost. I wonder if this would be true of our southern friends. This provides very serious food for thought.

In speaking of the future I said that we would give them every consideration owing to our very close relationship with Revere. However, we could not lose sight of the fact that Kaiser had helped us during very tough times and

that any switch on their contracts from delivery to Revere to delivery to Rome Cable would be known by Kaiser and we wondered how they would react to this. We made it quite clear that although we were optimistic on the future of aluminum that the policies of the integrated companies would determine to an appreciable extent the rate of our growth in this field. Mr. Wilson stated that they wished to enter into five year contracts. I gave him the history of how we had avoided these in the past and anticipated doing it in the future. Not knowing the policies of the aluminum companies over the next few years we are in no position to tie ourselves up in this manner. Louis Glesmann stated that he was sure they could arrange something that would be satisfactory to both parties.

It was left that we would have further discussions in May or June, but I gave no indication that we could place any business at that time. It was a very friendly meeting and should be considered in the nature of purely exploratory. We gave Mr. Wilson our specifications.

Indications were that Revere wished to sell up to 15,000 tons of their 60,000 ton allotment from Olin-Revere thinking that other aluminum suppliers could take care of them for anything above 45,000 tons a year when excess demands required.

Jack.

JHD:AS

[fol. 5190] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 130

To: All Salesmen
 From: D. H. Thayer—Rome
 Date: March 29, 1957
 Subject: T. J. Cope, Inc.

I am sure you will be interested to learn that, as of Monday, April 1, we have bought the plant equipment and other assets of T. J. Cope, Incorporated, Collegeville, Pennsylvania. Operations will remain in Collegeville and will be conducted under the name, T. J. Cope Division, Rome Cable Corporation.

We make this announcement with enthusiasm for in this further diversification of our product line we also broaden our service to the electrical industry, particularly with respect to the utility and industrial markets.

As many of you know, Cope has been a pioneer and leader in the development and manufacture of steel cable troughs, trays and racks along with other related products. Use of these items is becoming more widespread with the increased utilization of high voltage cables and promotion of interlocked armor construction. We feel that the sales possibilities for Cope products are very promising and the Cope name enjoys an excellent reputation in the trade.

While we take over the Cope organization on April 1, there will continue to be many problems connected with the integration of its functions with our own, particularly as they may influence sales policies. As soon as these can be resolved you will be fully advised.

Presently, Cope products are sold nationally through appointed agents. For your information a list of such agents is attached. No change in this set-up is contemplated for the moment but it is a matter that will be given thorough study. I believe you can appreciate, also, that there will be many problems of distribution, warehousing and sales policy to be clarified for smooth functioning. In the meantime, we wish we might have your thoughts and specifically request that all District Managers let us have their suggestions or recommendations.

We wish to cooperate fully with the present Cope sales organization. We should lose no opportunity to promote the sale of Cope products. A letter of announcement, as per the attached copy, is being mailed to our customers and it is suggested that you acquaint yourself with their requirements for cable troughs and trays.

If you are not already acquainted, please make a point of knowing the Cope representative in your area toward the end of working with him whenever possible.

Very truly yours, D. H. T.

DHT:rer

Attachment

[Vol. 5191] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 132

ROME CABLE
CORPORATION

ROME, N.Y.

REPORT SUBMITTED TO THE BOARD OF DIRECTORS
OF ROME CABLE CORPORATION AT THEIR MEETING
MARCH 4, 1958N.Y. OFFICE
CHARTERED BY THE STATE

I present record of sales and earnings after taxes by fiscal years from 1937 to date, and by quarters for the current year, the month of January and estimates for February and March:

<u>Fiscal Year Ended</u>	<u>Net Sales</u>	<u>Earnings</u>
March 31, 1937	\$ 1,798,092	\$ 1,616
March 31, 1938	4,957,103	71,027
March 31, 1939	5,370,665	245,036
March 31, 1940	6,088,902	297,736
March 31, 1941	9,465,451	431,501
March 31, 1942	11,631,785	592,135
March 31, 1943	12,712,333	367,654
March 31, 1944	16,909,735	466,709
March 31, 1945	22,798,218	486,653
March 31, 1946	16,975,009	398,973
March 31, 1947	18,436,305	1,359,593
March 31, 1948	25,202,853	1,152,579
March 31, 1949	26,088,523	1,115,960
March 31, 1950	19,602,984	302,209
	Plus: Transfer from contingency reserve	150,000
March 31, 1951	35,142,901	452,209
	Net	\$ 1,922,136
	Minus:	
	Transfer to Copper Reserve	150,000
March 31, 1952	42,657,848	1,772,136
March 31, 1953	54,632,976	1,753,651
March 31, 1954	44,114,825	2,008,321
March 31, 1955	39,186,095	1,637,787
March 31, 1956	56,996,682	930,879
March 31, 1957	52,790,055	2,023,070
April-June Quarter	19,420,000	2,255,819
July-September Quarter	11,009,000	351,000
October-December Quarter	9,810,000	352,000
TOTAL NINE MONTHS	32,239,000	228,000
January 1958	3,209,000	931,000
February (Est.)	2,483,000	56,000
March (Est.)	2,748,000	(58,000)
QUARTER TOTAL	8,440,000	(46,000)
TOTAL FISCAL YEAR (EST.)	\$ 40,679,000	\$ 883,000

[fol. 5192]

ROME CABLE CORPORATION

From the ten months comparison with the same period a year ago Rome plant profits dropped over \$1,100,000, approximately one-half of which is due to decreased volume, most of the rest is due to reduced prices between the two periods, mainly on construction wire items.

The current quarter has continued the downtrend in sales, particularly at Rome and mid-February additional 12-1/2% price reductions is the main reason for the loss of \$48,000 (8¢ per share) recorded for the quarter. Projected profit break-down for the current year for the three plants is -Torrance \$449,000, Rome \$361,000, Cope \$73,000, a total of \$883,000, or \$1.58 per share.

With the rapid changes in volume and the drastic affect of the sizable price reductions it is almost impossible to accurately predict earnings.

SALES AND ORDERS

The breakdown of sales before deduction for discount and freight from April to February, with February estimated, are as follows:

	April 1957 Feb. 1958*	April 1956 Feb. 1957	% Increase or (Decrease)
Rods	\$ 4,760,000	\$ 5,392,000	(11.7)
Bare	4,428,000	7,463,000	(40.7)
Weatherproof	1,318,000	2,293,000	(42.5)
Magnet	1,920,000	3,461,000	(44.5)
Rubber Covered	15,116,000	20,553,000	(26.5)
Aluminum	3,406,000	4,889,000	(30.3)
TOTAL ROME	30,948,000	44,051,000	(29.8)
EMT	2,411,000	2,466,000	(2.2)
Industube	519,000	486,000	6.8
Rigid	4,232,000	3,450,000	22.7
TOTAL TORRANCE	7,162,000	6,402,000	11.9
COPE	1,905,000	-	-
GRAND TOTAL	\$40,015,000	\$ 50,453,000	(20.7)

*** Preliminary**

For the fiscal year our total sales are estimated at approximately \$43,000,000 compared with \$55,000,000 a year ago, or a decline of 22%. Thirty-one per cent in Rome and an increase of 6% in Torrance.

On a quantity basis, using copper and aluminum, at Rome, we show an expected 18% drop between the two years. At Torrance a 2% drop in steel usage.

[Vol. 5193]

ROME CABLE CORPORATION**SALES AND ORDERS -Cont'd.**

While the final total for incoming orders on copper products is not completed for February the total looks as if it will exceed January by about 5% and be the best total since November. We are predicting another 5% increase in March over February.

Incoming orders for Aluminum products is off slightly in February.

Torrance showed expected drop from inflated January levels but should show at least 10% better in March than February.

Cope expects to be better by about 10% than February.

BACKLOG OF ORDERS

		<u>Value</u>
February 1, 1958	Rome-Copper Products	\$ 1,757,000
	Aluminum	139,000
	Torrance -EMT & Industube	84,000
	Rigid	42,000
		<u>\$ 2,022,000</u>
August 31, 1957	Rome-Copper Products	\$ 2,453,000
	Aluminum	415,000
	Torrance -EMT & Industube	87,000
	Rigid	20,000
		<u>\$ 2,975,000</u>
February 8, 1957	Rome-Copper Products	\$ 2,897,000
	Aluminum	513,000
	Torrance -EMT & Industube	48,000
	Rigid	177,000
		<u>\$ 3,635,000</u>

The above figures indicate practical elimination of any backlog. With continued weakness in the copper market and industry generally, customer purchasing is largely on a near-term basis which requires sizable stocks to service and adds to the complications of manufacturing with a reduced force where prompt service is the means of getting an order. This obviously adds to the cost of production.

RAW MATERIAL

All the materials we use continue in plentiful supply although most of the world's copper producers have announced cutbacks in production, the United States Copper Association figures indicate that to date this has been talk rather than action. Until supply, which has exceeded demand for two years, approaches demand, we feel that copper prices will remain at depressed levels.

Copper product sales by fabricators in January dropped to 57,000 tons, a reduction of 35,000 tons from December and by far the lowest month in many years.

[fol. 5194]

ROME CABLE CORPORATION

PAYROLL STATISTICS

<u>ROME</u>	<u>Week Ending</u>	<u>No. Emp.</u>	<u>Total Payroll</u>	<u>Avg. Wkly. Wage</u>	<u>Avg. Hrs. P/Wk.</u>	<u>No. Salaried Employees</u>
	2/10/57	M 864 F 30 894	\$ 80,952	\$ 90.55	40.3	457
	8/18/57	M 812 F 24 836	\$ 75,111	\$ 89.85	39.8 *	476
	2/23/58	M 665 F 38 695	\$ 63,412	\$ 91.24	39.8 **	456
* Includes 13 switched from hourly to salaried, 7 students and 13 summer help.						
** Includes 13 switched from hourly to salaried and 7 students.						
<u>TORRANCE</u>	2/16/57	135	\$ 13,830	\$ 102.45	40.4	48
	8/18/57	135	13,983	99.81	39.8	54
	2/16/58	115	12,413	107.05	40.0	55
<u>COPE</u>	4/20/57	57	\$ 4,176	\$ 73.26	40.3	34
	8/24/57	62	4,741	76.47	41.9	34
	2/22/58	54	3,750	69.44	37.0	34

From the above you will note that the number of hourly workers has been reduced approximately 200 at the Rome plant, while the number of salaried workers remains approximately the same. Twenty of the additions to the Rome salaried payroll are due to transfers from hourly workers and the seven new students we have in our Student Course this year.

This subject has been given a great deal of study in Rome and plans are already laid for the reduction of approximately 29 people in the current year due to retirement, resignations and contemplated reduction in force. Further studies on ways and means of reducing this will be discussed at the meeting.

[fol. 5195]

ROME CABLE CORPORATION**LABOR**

We signed a contract with the Steelworkers representing our production people at Torrance running to October 18, 1959, which granted 7 cents per hour increase on December 16, 1957 and 7 cents on October 13, 1958. We also granted an eighth paid holiday and extended the same Health Care Plan that we had at Rome. This contract contains nothing other than what we had granted in Rome contract, and is the same as was voluntarily granted in December of 1956 before we had a Union in Rome.

We have had more than our growing pains in working out details with the Union at Rome. They have had a sizable number of petty grievances which have regrettably taken a great deal of our top manufacturing people's time. I believe, however, most of it has been necessary to get across our position and we were ready to go to arbitration to establish our viewpoint on seniority, in lay offs. Present indications are that the Union leaders are backing down in their claims owing to evidences of discontent among the members. The sizable number of layoffs in the last three months necessitating "bumping" of jobs has added considerably to our production problems.

INVENTORIES

In January our inventories were reduced by approximately \$950,000 from December. We expect to effect an additional reduction of \$200,000 to \$300,000 before the end of the fiscal year.

T. J. COPE DIVISION

Our Cope Division has had a downturn in sales in the last few months. This, plus inventory adjustments necessary after the final settlement will cut into profits to the extent of about \$25,000 in the current quarter and end the year at an estimated \$73,000. Total sales for the year will run just under two million dollars. The organization is doing an excellent job and is confident that we will hit two and a half million sales in the new fiscal year. They have just brought out a new catalogue, which is an excellent sales help.

They are working on two new products, a bus box and a Geon wireway. We hope these will be available early in the new year.

Allan Ziegler is very anxious to have us get a larger tract of land for future expansion, as his present location is very limited. I think this should be deferred for the time being.

TORRANCE

Torrance will have a record year in both sales and earnings. They are right on schedule in their work on the equipment and installation to produce 2-1/2 to 4" rigid conduit. They expect to have this available by October 1st. Fortunately, prices have been quite stable in the conduit business, and are improving in the Industube, after a very competitive period last Fall.

[fol. 5196]

ROME CABLE CORPORATION**PRICES**

As previously mentioned price cuts mainly in construction wires and low voltage power cables cost us almost half a million dollars, compared to the 1956 similar period. Another seventy-five to one hundred thousand dollars can be added to this in February and March. The wire industry is a sorry contradiction to labor's contention that manufacturers move prices up with each wage increase. Despite an 80% rise in wage rates from the end of World War II we are today selling many items considerably below prices in effect at that time. We have a great deal of evidence showing improved manufacturing efficiency in reduced costs but even these cannot keep pace with such unrealistic pricing methods.

COST REDUCTIONS

When our capital equipment program of \$427,000 at Rome is completed it should show savings of approximately \$12,000 per month. One-third of these have already been accomplished and it will rise to one-half before the end of the fiscal year. Industrial engineering savings through new incentive rates will total approximately \$40,000 per year. We have not been able to fully realize the estimated savings from our indirect labor incentive, owing to lowered volume and changes in personnel due to layoffs, so that it is a bit more difficult to estimate actual savings during the current period. They should exceed \$100,000 per year in more normal production periods.

With the closing of our Cafeteria by May or June and substituting automatic dispensers we will save an estimated \$50,000 to \$80,000 per year.

We have just reorganized our Cost Reduction Committee and our latest estimate, which I have in detailed form, projects actual items which will generate cost reductions in Rome running \$200,000 to \$250,000 annually.

INDUSTRY STATISTICS

From the various industry statistics which we have available to us we can tell you that use of copper by wire mills was off 10% compared to 1956. Our own consumption of copper bolstered by heavier toll production was also off 10%. Because of our efforts to "hold the line" on some price sheet items we lost some ground in our proportion of construction wire and low voltage power cable products, and thin wall conduit. We maintained our position, or bettered it, in magnet wire, cords, molded cords, and cables, plastic control cables, and had a sizable increase in our proportion of rigid conduit. Despite the most unrealistic type of competition by some of the large aluminum producers our proportionate loss in the manufacture of our own aluminum insulated wire did not suffer as badly as we feared. With ALCOA making all their own plastic wire in the past year our total volume of production on this item, of course, was much curtailed.

[fol. 5197]

ROME CABLE CORPORATION**SALES BUDGET & EARNINGS PROJECTION FOR FISCAL 1958**

The original sales budget for fiscal '58, prepared in January, showed a 10% increase over estimated '57 on Rome products, 8% on Torrance and 25% on Cope. I cut this estimate 10% right down the line, which brought overall volume estimates to approximately the 1957 level with lower activity in the early part of the year and heavier in the latter half of our fiscal year. Taking this figure and using January sales prices and various cost reductions mentioned elsewhere in this report, produced a profit estimate of approximately \$1,100,000 or about \$2.00 per share. At construction wire prices 7-1/2% below January for the year the result would be approximately \$850,000, or \$1.50 per share. Taking the latest reduction of 12-1/2% the estimate would run approximately \$625,000, or \$1.10 per share. We must not lose sight of the fact that on the basis of past history in this industry further price reductions, and our policy to really meet competition could definitely affect these estimates. On the other hand history has demonstrated that such periods of most unrealistic prices have been relatively short lived.

CAPITAL EXPENDITURES

We have been able to save approximately \$300,000 on the original estimate of required capital expenditures for the current fiscal year. As matters stand now we expect to spend \$1,517,500 cash outlay in fiscal 1957. We will carry-over \$498,500 and approval is requested for \$311,500 for the new fiscal year. This would bring, without consideration of any carry-overs into the next fiscal year, total expected cash outlay in fiscal 1958 of \$810,000. Projected depreciation for that year is \$966,000. A table showing the planned distribution of expenditures, carry-overs and 1958 requests is as follows:

	1957 Expenditures	Carry-overs	Requested 1958
Rome	\$ 1,274,000	\$ 228,000	\$ 140,000
Torrance	223,000	257,000	150,000
Cope	20,500	13,500	21,500
	\$ 1,517,500	\$ 498,500	\$ 311,500

RESEARCH

Our laboratory building is about 90% completed and it is hoped that we will move early in April. Total cost including consulting services will be \$675,000. The equipment originally estimated at \$100,000 is expected to be covered with a total of \$75,000, of which all but \$13,000 will be in current year approvals.

We are encountering difficulties in locating a man for Assistant Research Director. Most of the desirable candidates are already well settled and are loath to change. Dr. Schatzel believes that progress will be better when we can actually show them the building. We feel we have a candidate for the mechanical engineer needed, possibly within our own organization.

[Vol. 5198]

ROME CABLE CORPORATION**RESEARCH - Cont'd.**

We are studying appropriate program for formal opening the new Research Center with program commensurate to the current economic situation, without, however, losing sight of the great potential value that a dignified proper opening would, we believe, pay dividends in the future.

NEW PRODUCTS AND DEVELOPMENTS

Our enamelled rectangular magnet wire is now in the hands of some customers for tests. It was a necessary addition to our line if we were to maintain our position with our customers in the heavy magnet wire field. We are pleased with the results from our new flat rolling equipment. Production coming off that equipment for the Simplex order for use on the trans-Atlantic cable is adjudged the best we have ever produced.

While we have not had any major new products added to our insulated wire and cable line during the past year we have made noteworthy strides in instrumentation cables for computers and missile launchings. We have been asked by Hazeltine, a sub-contractor for IBM, to add to the sizable volume we have already been producing for them. The original request covered some Teflon cables and our engineering and research department has developed a new specification and made a sample, using foam polyethylene. We believe that this new construction can be profitable.

In the current fiscal year we have sold over \$600,000 of instrumentation cable through January. I have been well pleased with the high percentage of orders we are getting on quotations made. I wish to commend Engineering, Research, Production, Accounting and Sales for the fine cooperative effort on these products. With heavier defense expenditures in this field our sales volume should continue to grow, and our new cabling capacity planned two years ago will come in to excellent use when it is installed in the latter part of the next quarter.

We are also working with certain other customers on special projects which could add considerably to our volume. Our new research facilities will certainly be very helpful on these programs, and our timing in having them available is none too soon.

DIVIDENDS

Conditions have changed rapidly since our last meeting and our earnings estimate has been reduced. Even with all of the uncertainties it seems probable that we will finally end up with an amount slightly in excess of the \$1.40 per year rate. Our dividend policy has always been on a conservative basis and in the two prior periods where we only earned our dividend or slightly more, in fiscal 1949 and 1954, we paid at the then regular rate. Estimates of current and future earnings, as well as cash flow, will be presented for the Directors' consideration in determining the declaration at this time. Whatever declaration is made should also be followed through as far as the employee

[fol. 6199]

ROME CABLE CORPORATION**DIVIDENDS - Cont'd.**

dividend and profit sharing trust are concerned. I believe there is merit in considering and even announcing to the employees a potential modification by the time of the next dividend action. We will have discussion on that and the legal reasons for such, if taken, will be presented.

ADVERTISING BUDGET

We cutback our advertising budget for the current year by \$55,000 in Rome but Cope exceeded their budget by \$20,000, owing to the catalogue price exceeding estimates. The Advertising Department has prepared an excellent budget and requested \$366,000, \$293,000 of which is for Rome and Torrance. These budgets are somewhat lower than submitted by our agencies. At this time I believe we should limit our total to \$300,000.

I feel our newly reorganized Advertising Department has done an excellent job in the past year.

PENSIONS

Forty-nine additional people have been added to the salaried pension plan insured with Bankers Life and there are now 444 people covered under this plan, with 12 drawing pensions and 69 drawing pensions under our latest plan from Massachusetts Mutual.

Our estimates of earnings included only payment of \$350,000 on Massachusetts Mutual-J.P. Morgan, Incorporated Plan rather than \$481,000 which would give us eleven years payment on back services and would save us \$861,000 for interest charges versus the thirty year refunding covered by payment of only \$350,000. It is recommended that payment of \$200,000 be made to J.P. Morgan & Co. Incorporated for the supplemental pension trust before March 31 and that power be given to the Executive Committee for review of any additional payment depending on year-end results and the possible tax advantages, without charging the full amount to current year's earnings. We got 3-3/4% on money deposited with Massachusetts Mutual. Our pension trust had a book value of \$649,000 at December 31, 1957 and a market value of \$621,000, with an estimated annual return of approximately \$28,000, or 4.30%.

PROFIT SHARING TRUST

Our Profit Sharing Trust had a book value of \$133,000 at December 31, 1957, market value of \$130,000 and annual return of approximately \$7,000 and yield at book value of 5.32%.

[fol. 5200]

ROME CABLE CORPORATION**ROME CABLE FOUNDATION, INC.**

At the last meeting we approved \$25,000 contribution to the Foundation. Earnings figures presented include another \$25,000 grant before March 31st. I recommend that we approve another \$25,000 to the Foundation for the current fiscal year, as their cash balance will be nearly depleted by March 31st.

As of February 28, 1958 our investment portfolio had a cost value of \$298,000 and market of \$275,000 with an annual income of approximately \$17,000, or about 5.7%.

EXECUTIVE BONUS

With predicted earnings the executive bonus will be either nothing or probably not more than \$30,000 to \$50,000 compared to \$406,000 a year ago. This represents a compensation loss of approximately 40% to all the members on a full participation basis and one-half that to those on a half participation basis. This further brings out that the modification that we made two years ago was not adequate and I believe somewhat unfair from a tax angle to the participants, as well as endangering morale. I believe that study should be started which could take into consideration some plan of deferred payments or spread payments on high years over an extended period, as some companies do, in order to make our rates of compensation compare more favorably at all times with others in the industry.

RENEGOTIATION

We have at last been advised by the New York office of the Renegotiation Board that they are willing to make settlement for the years ended March 31, 1954 and March 31, 1955 for a gross amount of \$250,000, net after all tax corrections of approximately \$48,000. This, if approved by Washington would give us a higher rate of earnings return in those two years than in the previous years which we have closed. Their offer was made early in February and we should hear from Washington prior to the publishing of our annual report.

TAX REFUNDS

We have been negotiating with the Syracuse Internal Revenue Office for a refund of \$109,000 on certain past years. They have conceded \$33,000 and our auditors feel that the full \$109,000 will be allowed. The Syracuse office has written to Washington for a ruling.

[fol. 5201]

ROME CABLE CORPORATION**EXPANSION AND ACQUISITIONS**

Discussions with Alwalt were delayed by them until they could take an inventory and prepare new financial data covering the first nine months of operations under the new incorporation, with separate manufacturing and selling units. These figures have just been received with no time to analyze them as I write this report. A letter from their attorney to Walter Danielson, our attorney in Los Angeles, talked of a figure of \$1,500,000 as a purchase price, which on the basis of previous financial data is out of all reason. I will discuss this matter at the meeting.

We also received from Manufacturers Trust an inquiry as to whether we might be interested in acquiring William Brand Company of Connecticut. We do not have all of the data that we requested on this company, but a preliminary review of what we do have does not stir up too much interest in our Executive Committee. This will also be discussed at the meeting.

Hardly a week goes by but what we receive some kind of letter on this subject. At our "Whither Goest Thou?" meeting I asked Jack Dyett to review our studies and bring them up-to-date on several companies in the industry that we have discussed from time to time. At the same meeting Charlie Ellis was asked to prepare estimates for a unit to produce certain plastic wires at another location, with Glenn Rolston providing a list of favorite locations from market viewpoint. A study has also been asked and started on possible production of certain instrumentation wires on the West Coast.

"WHITHER GOEST THOU?"

Our annual "Whither Goest Thou?" meeting was held about two weeks ago, and in addition to a number of the subjects previously covered in this report, we had full and frank discussions, and assignment of responsibility where needed, on competition, sales policy, consigned stocks, communications, new products, new processes, new equipment, budgets, etc. I feel it was a most constructive and decision making meeting.

ORGANIZATIONAL AUDIT

Two weeks ago we also had our annual organizational audit meeting. I feel that overall our organization today is stronger than it has been in many years, but our meeting emphasized a number of problems. Within the next five years and still more when we stretch our sights for ten years we are faced with retirement of many men who have been most influential in their contributions to the growth of our Company. Some are talking of earlier retirement.

We have a wonderful group of young men coming along in the Company. For two or three years I have urged that these young men be given greater responsibility and authority to better prepare them for their future responsibilities. Our student program has proven an effective means of adding new blood to the organization.

[fol. 5202]

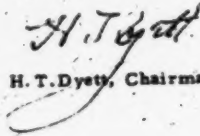
ROME CABLE CORPORATION

In such times as these I hope we will not color our decisions to discourage the enthusiasm of our organization and make some of them seek elsewhere for the kind of opportunity that they expect, and, with the future of our industry we should be able to provide. I hope it is not going to be necessary to eliminate our student program for the new year. I hope also we will actively pursue getting the necessary additions to our organization in the several spots that conditions and new developments indicate are necessary.

GENERAL

This has been a long report but we felt it advisable to outline in more detail than usual some of our problems and give you an indication of what we are trying to do about them. We also hope it will form a background for decisions and policy making. These are perilous times for many companies but we still continue to have great faith in the future of the electrical industry, and the great needs of utility, equipment manufacturers, chemical, mining, oil and other industries which we serve.

Respectfully submitted,



H. T. Dyett, Chairman of the Board

[fol. 5203]

<u>DATE</u>	<u>R. R. Co.</u>	<u>Description</u>	<u>Amount</u>
1886		Purchase and install a Pratt & Whitney gauge on flat rolling machine	\$1,000
1887		Purchase and install four pumps	1,500
1889		Purchase 1 roller type take-up with reel ejector	2,425
1890		Purchase and install wire preheater for plastic extruder	1,000
1891		Purchase and install new wall hung and floor cabinets, sinks	11,700
1895		Purchase and install one IBM Time Recorder and Relay	500
1896		Purchase and install Thomson-McCook hopper, heating and loading machine	1,500
1897		Purchase and install two heads and stands over extruders in Reflex finishing machine	1,100
1898		Purchase J&C welder for C.V. Machine	600
1899		Purchase a Davis portable combustion analyzer	975
1900		Purchase and install an Addison Electric Co. diameter control system for use on #6 plastic extruder	1,800
1901		Provide stainless steel ventilation heads over the pickle tank and hot water rinse tank in Red Mill	12,000
1902		Purchase and install Pratt & Whitney gauge on three strand rolling machine	1,000
1903		Purchase 1 elec. operated plastic welding torch	150
1904		Purchase 3 adjustable coil blocks to coil Trilux	1,150
1905		Purchase 2 special 6" extrusion screws in CV & Tubex	3,000
1906		Purchase and install 1 Edwards Twisting Machine	8,000
1907		Purchase office furniture, etc. for Research Bldg.	7,000
1908		Purchase and install metallurgical equipment in Laboratory	10,750
1909		Purchase and install a Kingsley Wire Marking Machine	1,500
1910		Purchase and install 2 zinc stearate applicators	1,500
1911		Purchase and install 7 measuring machines	1,600
1912		Purchase and install a payoff with elec. brake	1,700
1913		Purchase and install 3 sets of stairs to CV extruders	1,500
1914		Purchase and install a hoist, bridge and rails on #5 CV	1,250
1915		Purchase material, machine, etc. for rolling mill	1,800
1916		Purchase furniture for lobby and library in new building	2,500
1917		Purchase and install 4000 lb. capacity coil block	6,800
1918		Purchase lined cylinder sections for cylindrical machines	4,450
1919		Purchase and install binding head	325
1920		Purchase and install 2 taping heads	2,250
1921		Provide labor and material to insulate hot air duct in Red Mill	1,800
1922		Provide set of stairs in Bldg. 25	800
1923		Erect concrete block enclosure in Bldg. 4	1,225

\$ 114,150

[fol. 5204]

<u>R. L. No.</u>	<u>Description</u>	<u>Amount</u>	
<u>TORRANCE</u>			
C-297	Construct finish line for Rigid Conduit on Hot Dip Unit	1,920	
C-298	Install automatic thread protector applicator in Rigid Finish Line	5,085	
C-300	Purchase a new Clark "Utilitrac"	6,436	
C-301	Purchase and install new motor driven air compressor	16,678	
C-302	Make complete set of Tube Mill Rolls for production of 2-1/2" - 3" and 3-1/2", 4" rigid	38,720	
C-303	Fabricate and install 68 ft. of Electroplater	2,513	
C-304	Purchase and install one threader	21,230	
C-305	Purchase and install galvanizing unit for production of 2 1/2 - 3 - 3 1/2 and 4" rigid	177,955	
C-306	Fabricate and install Crane system	6,854	
C-307	Purchase and install overhead rolling door	1,402	
C-308	Purchase equipment and install one plate shear on tube mill	1,302	
C-309	Fabricate and install Feeding Mechanism	650	
C-310	Purchase and install 14x16 steel rolling door	780	\$281,605
<u>COPE</u>			
F-10	Purchase Johnson Model J B and Saw	769	
F-11	Purchase one Upsoner Industrial Vacuum Cleaner	686	
F-9	Install a complete wet pipe sprinkler system in office buildings M and N	9,500	
F-12	Purchase 5-139 jak tung trucks	489.41	
F-13	Workbenches for use in shop	950.11	\$ 12,312.52
Additional R.L.'s approved			
<u>ROSS</u>			
1894-A	Purchase additional gauges and a diamond chip sieve shaking machine and accessories	\$ 2,500	
1898-A	Purchase and install 2 concentric tapping heads	5,000	\$ 7,500
<u>TORRANCE</u>			
C-278-B	Additional expense involved in completing new Lab	300	
C-289-A	Additional expense of furniture & fixtures	475	
C-296-A	Additional expense involved in completing construction work in Maintenance Bldg.	110	\$. 885
			\$ 426,452.52

[fol. 5205] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 133

September 2, 1958.

Rome Cable Sales Meeting

Engineering Session

R. A. Schatzel

I want to extend greetings to everyone and to issue to you a cordial invitation to drop over and visit these new Research facilities of yours. I notice that our time is pretty short this morning, and so I will not take much time to go into any elaborate generalities but get down to the business at hand, and that is, to provide you information, and to help you do the job that Ross has outlined and that we all have before us.

The competitive picture you know better than I, and it isn't alone a picture that we control in this country—it's one that we have a pressure from many other places, and yet I feel that we have met that kind of competition in the past and that we can, and will meet it now, but you will have to make the best use of our abilities and our facilities.

Before going into those, I'd like to introduce Dr. Fuller—would you please stand. Dr. Fuller is our Consultant. You've heard about him many years he's been with us, but today he was able to make it.

As you know, we do not have a Student Training Course this year, so I don't have a group of students to introduce to you. That doesn't mean that we have abandoned the idea, we may still have some, but at the moment we don't.

During the year we have not added appreciably to our Staff. The only new addition, I believe, is Steve Jovanovitch—would you stand please. Steve has had 12 years experience in the cable industry in England and we think, will be an addition to our Product Development Dept. in the Laboratory.

[fol. 5206] Most of you have been over to visit our new Research and Engineering building, and I don't need to describe very much the building itself. Those that have not, I'm sure will be there, and we'll see that you're taken

through and told something about what is in it. One of the things that you'll notice as you come in is the display in the Lobby. We're going to have a permanent display there, and we hope both the building and what's in it, is going to be something that will be of use to you in selling our products, in selling your customers on Rome Cable. In that display that you will see over there—at the present, there's some improvements to be made, but in general it will show the products we make, the materials we use in making them, and the typical applications of them in photographs which will be above. In addition to that, we expect that we will have some outstanding products—say of the month, or the products that we have led in as the leader in the Industry, Rome Firsts. Those are not there now, but they will be as we get that display completed.

Another thing, in going through a building, it's hard to visualize just what it's for, and I'm going to try to outline that to you very briefly now.

As we said last year, our Laboratory facilities, (and we hope that this will help you with your customers), are divided up into a number of laboratories which are coordinated through our Director of Research. We hope that in each one of those, that they feel their responsibility for their own growth and their own development, and that they feel that they have a responsibility for ferreting out problems and bringing them to us, as well as for us to bring them to them.

[fol. 5207] We have a Metallurgical Department which is equipped now with a small foundry in the basement, with a unit that can hot roll, cold roll, draw, heat-treat, do the metallographic and other testing. It can do metallographic work complete from melt to the finished product on a laboratory scale. The only thing that is not complete in that, and which we do not need at the present time, is spectrographic work, and that we can get locally, and we can also get overnight in New York—so there's nothing at the moment that we lack there.

We do have some important problems because this whole thing with Ross, as outlined this morning, is one where an industry is growing in precision and control. Those are the things that are meant by Automation. Those are the things that develop a greater output per manpower hour;

those are the things that mean reduced cost and increased quality, and those are the things that we're trying to prepare for and have to do—there's no way out of it. We're going to meet competition. We're building in that direction; we have a Product Development Department which is under Mr. Duffy, and directly reporting to Mr. McCutchan, and that we're reinforcing. That is a large department, including the Electrical Laboratory itself, because you cannot do product development without evaluation, and that is the function of those two departments. I might say subdepartments of the other, and in that you will notice that we are not complete, but we have under-way plans for developing equipment that will allow us on a small scale, to do taping, to do processes that we cannot do in the plant; to duplicate others that we do in the plant, and at the same time, test products developed. Such things as the great number of synthetic fibrous tapes that are coming out, we [fol. 5208] couldn't possibly use in the plant at the present time.

Another thing which we are faced with, and that is a thing that we hope to meet, is that with all these new materials that are coming out, one of the limitations placed on them by all of us and by industry generally, excepting the few that are now stepping out as leaders, is that when we bring out a new synthetic material we make it a condition that it work on our present equipment, and immediately we start modifying that new material until we have lost its real advantage in properties and have made it fit a piece of equipment which it wasn't designed to do. Materials and equipment go together; sometimes have to be designed one to fit the other. We're doing the whole problem now, by making the material fit the machines we have, and the processes we have, rather than to design new equipment, new processes to make best use of materials that are developed. That will be also part of that department, along with the Mechanical Dept. which is already in being, and which you've seen upstairs. We have also a Analytical and Control department there for approvals of new materials and development of methods which will work with this expanded Technical Superintendent's department; an Organic Chemical Laboratory, which will work not alone with suppliers, but to modify or develop Polymers and

resins, particularly needed for our own use, and with that a group which we called Instrumentation last year. I think perhaps the better name is Applied Physics, in the upstairs Laboratory, which is investigating many of these newer developments in order to see where they best fit into making a better product, improving the process or improving our methods of making them.

Those are things that are expanded; some of them are [fol. 5209] new, but when you go over I want you to see that building as a unit—not as these separate departments—because it's only through their coordination and their work together as a team, that they become useful; but to make them all conform to just one particular pattern is not going to be what you're going to see; they're going to have a blueprint of the man at the head of it.

Our Plastics and Rubber department is quite complete and, I think, will be the most versatile I know of in this industry—capable of duplicating any process that we have in the plant and of exceeding that, because we will have in that department equipment for extrusion of rubber and plastic products that at the moment we won't be able to handle in the plant. But through the work that we do there, the guidance for the handling of them in the plant and the guidance to our plant engineering for the development of similar equipment will be given.

I've mentioned the Technical Superintendent's department during the week, and I think Charlie will want to expand on that, but that department has been expanded and we have transferred a very capable man as the head of it, in Lee White whom you've met before, and I won't ask to stand now; but that department will control the day-to-day technical operations of the plant.

Another department that I want to mention which hasn't been expanded, but which has been developed further, and perhaps later in the morning discussions can come on that, and that is, the Quality Control Dept. The Quality Control Department, working closely with our plant production, is [fol. 5210] your representative, the same as the general or overall inspection is, in holding up the quality of products during process, and at the request of our Production Department and with their help they have evolved a plan of what we call "Workmanship Audit" in the department.

By regular inspection they are checking to see if machines are properly set up, that the materials are properly kept, that the workman is making his necessary checks, and so forth. Then a regular form which I can't go into with the limited time now; if you fellows are around any time and are interested in that, I'd be awfully glad to show it to you, because we believe that it is another tool in meeting this competition, and it's a tool which Rome Cable has been getting some recognition for in this particular field.

I don't need to talk about our Inspection. P. Isom has been doing an excellent job, and I think that the department is working so closely with the Quality Control Department in setting up inspection procedures, that we can be proud of it.

Now I'm not going to have too much time to touch on many of the other things that I have here, but they'll come out later. Some of the items that have come up in the year—some of the items that you fellows have been particularly interested in—are what we are doing on Triple AC Alloy to meet Kaiser competition. We've investigated that. We have had wire in here, we've endeavored to buy rods so we could draw it ourselves, but that was impossible; but we have been able to offer and are offering, the 5005 Alloy, which is an alloy that Reynolds brought out two years ago. It is also available, I believe, to Alcoa, and as far as Triple AC goes, that seems to be a pretty good answer at the present time. However, there is another new development coming in and that is, this one of Copperweld, the Alumoweld. [fol. 5211] Alumoweld is about what we talked to you several years ago, and each year during the past several years that Alcoa was developing. But Copperweld went to Battelle Memorial Institute and have developed and are offering a 30% conductivity Aluminum Clad Steel Conductor, which can be processed and drawn, and we can purchase that through Copperweld. At the present time their production is limited, but they are building a plant, and I think that sometime early next year it will be available in quantity; but samples are available right now and we'll get some information out to you in the field after we evaluate it. You do have available, 5005 Alloy, and in our estimation it is a very excellent material as a competitor to the Kaiser Triple AC.

We also had a number of questions during the year about the 62% conductivity of Kaiser and its advertising and competition. The question has come, why we don't do it. We have not been able at the moment to meet 62% conductivity on hard-drawn wire. We meet 62% conductivity on rolled rods; we can meet and do meet about 61.8% on hard-drawn wire. The question has also been asked by you—does Aluminum Co. meet it? To the best of our knowledge they do. We are working with the suppliers of aluminum to improve on the Pig that is supplied to us, and we are making progress. As we said, our rod itself does meet 62% conductivity, but not the drawn wire—we are trying to do that. However, we'd like some guidance from you as to its importance. Our own estimation of it is—it's purely a gimmick—it has no importance. The difference between 62 and 61.8% conductivity is less than the variation in dimensions that are allowed, and its effect on the operation of a line is negligible; but I do know that it is a factor in advertising, and if you have trouble with it you should let us know and we'll see that we can do to help you.

Hi-Density and Cross-Linked Polyethylene

Now the next thing that I have on my list is Hi-Density Polyethylene. In that connection there's a great deal of work being done, but you'll hear more about that I think, during our discussion. We feel that it has at the moment, a limited use. It's difficult to remove from wire, and there is some question about some of its properties—environmental cracking, and other properties, when it's put on in certain films, but I might say this, that all that we have supplied, and the only source that we use, has none of those weaknesses, that we can find. The only weakness that it does have is its hard nature and difficult removal from wire, and it doesn't seem to have advantages other than the higher softening point and abrasion resistance.

Another development in that is what is called a cross-linked. You're hearing from that from G.E. as Vulkene. Well, we are working on that, and may have something later to tell you about it. It may become available on a license agreement, or it may become available through some of the work we're doing with another company who

are working on this product. Many of you want to know what cross-linked is, anyway. Cross-linking, if you look at this thing as a material that has molecules lined up in chains in parallel direction. Cross-linking would be a method of bonding those two chains at various points, like those two tables down through here. If you could put a spike across them, that would be a cross-linking of those parallel chains. It's the same thing as vulcanization; it's [fol. 5213] not carried out with sulphur or the same process, but it means the same thing as vulcanization—so if after it has been cross-linked, it has lost a good deal of its thermoplastic property, and has a much higher melting point and much greater toughness. Now that is one of the things which I think during the year you'll hear more of, and just wanted to assure you that we're working on it.

Spacer Cable

I have one other item that I think I'll cover in spite of the fact that we're trying to hold to a time schedule, and that is, the development of the Spacer type cable and what the situation is on Spacer type cable. When that came out we took the problem of developing a competitive material, and mainly our Electrical Lab. product development group, particularly Duffy and Marwick, came up with some ideas of designs which were tried out, and we finally hit on a design which we think has advantages, and at the same time avoids the patent of Hendrix. Now the fact that Hendrix has three patents—there's only one that we are concerned with. Hendrix Spacer has two parts, identical but in reverse, so that as you put them together they become clamped around the cable. Now that is patented and that patent is specific. Every claim in it requires that the clamp be made of two identical parts, which in reverse form a closed clamp around the cable. Now that is patented and that patent is specific. Every claim in it requires that the clamp be made of two identical parts, which in reverse form a closed clamp around the wire. In his patent also, is a claim or claims on a system, which he calls a cable, and that includes the wire, the messenger and the clamp itself as a cable system. For a long while that stumped us, even though we had a clamp. The question was, what is the [fol. 5214] interpretation of the system, and what has

Hendrix been allowed? Does the fact that he has a patent on a cable system, including a cable clamp, mean that he has a patent on a cable system that includes every cable clamp, insulated clamp, because the use of metal cable clamps or conducting cable clamps is old, but his is specifically an insulated cable clamp; so does he have a patent which says that his patent covers a system or a cable, including insulated conductors and messenger of all designs? Our patent attorney has given us an opinion that all the Hendrix claims are limited to a cable system in which you use a clamp that has two like reversed sections only. Any other clamp that does not infringe his clamp is not covered as a system. So that we feel free now to say that we do not infringe his clamp or his system. You might ask then, why did Flowers get out of it? Well, Flowers had a clamp which also included two reverse sections and directly infringed Hendrix's Clamp. Therefore it also infringed on his system, but the question of whether we have a patent or not is still to be settled. We can't say that we have a patent—we do say that we are free, that we do not infringe Hendrix's Clamp or his claims of a system, and therefore, this will be given to you to sell. Now Glenn and I have talked about this and Glenn will outline more completely the policy on which this will be done. But essentially, as far as the construction is concerned, the system we will offer will consist of Spacers and the insulated conductors, with the grommets—the messenger will be optional. Our recommendation for a type of conductor will be either aluminum or copper conductor insulated with Tree wire thicknesses of high-molecular weight Polyethylene; that's [fol. 5215] our recommendation. That is not what probably the great majority will use, because from a look over the orders, they are ordering everything from full thickness of PVC, full thickness of Hi-Density Polyethylene, full thickness of high-molecular weight Polyethylene, Butyl or Oil-base with Neoprene, and those are all ordered as the insulated conductors, and so they're all standard conductors. There's nothing special about them; they can be furnished, and yet you'll want some recommendation of a standard from us and that will be it; (Tree wire thickness of High-molecular weight Polyethylene)—yet we could furnish any of these others, and Glenn, I think, had better out-

line that to you. Now through the Cope Division we will also be able to recommend accessories for pulling-in.

Rome Cable Manual

Our Rome Cable Manual which is out now just a year and the second edition is a year old. 50% of them are out in the field—we still have 50%, and it would be helpful if you would send in as you did in the past; any comments or criticisms or suggestions. Generally those come in the first part of the offer—it doesn't come so much later.

Regarding the Spacer Cable, you will be sent a bulletin of instruction, and an instruction for installation. We'll also send you a complete Spacer of this type with the grommets, and I think that will give you all that you need for this particular purpose.

A Few Items of Industry Activity

The ASA held a conference last month to discuss the need and practicability of a National Building Code. This was sparked by H. Luce, Editor of Life. While there was strong sentiment for it, there was a great deal of opposition from powerful segments of Industry, including Labor. [fol. 5216] The chances of its formulation are not bright.

Mr. Selden, who is Chairman of the NEMA Technical Committee on Conduit is now also alternate to our Jack Edwards as a member of The Codes and Standards Committee, as well as on Code Making Panel #6. Mr. R. C. Graham continues for a third year as a Vice-President of IPCEA and who have done a great deal of important work to be later discussed. The following changes adopted or to be adopted by the Code will affect you during the year:

- A. New Wire Type TBS. Thermoplastic insulated, braid covered switchboard wire rated 90°C. Approved in sizes 14 through 4/0. This product is designed to replace Type A. We have submitted and have obtained U/L listing.
- B. Ozone-resistant insulation must be used on all wires rated over 2 KV. This will prohibit ordinary Type R, RW, etc. from use over 2 KV. Sizes 14 and 12 limited to 2 KV maximum—#10 limited to 4 KV and #8 to 5 KV maximum, i.e. #8 smallest size for 5 KV.

C. New wire Type SA. Silicone insulated, glass or as-

bestos covered wire rated at 90°C. for use in dry locations. For special applications can be rated at 125°C. Would be recognized in sizes 14 thru 2000 MCM.

D. Shielding of high-voltage cables will be by means of metallic shield only, no semi-conducting shields in the future.

E. NFPA Raceway Fill Investigation—Interim Amendment #110. No official action taken as yet by Code Panel. Confusion has delayed this program. May still be clarified so that recommendations of the Committee can be adopted in the 1958 Code.

[fol. 5217] F. THW—Code Panels have accepted proposal submitted by Rome, Simplex, and Plastic Wire. Will be rated 75°C. dry or wet in sizes 14 thru 500 MCM, 3/64" minimum insulation thickness. U/L expected to adopt Code recommendations.

We are aware of the fact that several of our competitors have issued specifications for High-voltage Butyl rubber compounds with requirements in excess of those of IPCEA and ASTM. We have authorized you to meet such specifications in some cases. Our compound does meet them. It is probable we also will issue such a specification in an endeavor to develop a uniform standard of this kind.

[fol. 5218] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 134

To: Mr. J. R. Woods

From: C. J. McMurtry

Date: December 5, 1958

Subject: Knoxville Utilities Board, Knoxville, Tennessee

Dear Jack:

Gene had been pressing to see if we could not get on the approved list for KUB for aluminum bare both all aluminum and ACSR. The approval for this might have its bearing in the future because there is always the possibility that KUB will switch to aluminum triplex, etc. in lieu of the copper bare and weatherproof to which they are

now sticking. Gene was told that if we are on the approved list of TVA for aluminum, there would be no hesitancy on the part of K&B in putting us on the approved list. However, then Gene ran into the stumbling block as he found we were not on the approved list at TVA.

It seems that the procedure with TVA would be to request approval of our aluminum products and that TVA would then arrange for probably two or three of their engineers to visit our plant, inspect our facilities and production and then give approval. Had we formerly been on the list and then removed, the plant inspection would not be necessary. Apparently however, we have never been on the approved list or made any effort to be in the past.

I hesitate to request such approval without consideration by you. Are we sure that there would not be an unfavorable report because if there were to be, it could have a deleterious effect with others of the large municipals in Tennessee.

The other question is whether it would be worthwhile because based on the competitive situations that usually develop with any sizable inquiry (and practically all TVA requisitions for this type conductor would be large) we just let ourselves open for a lot of useless quotations. If we fail to quote, we would be removed from the bidding list although I do not feel that this would affect our status as being an approved supplier.

I would appreciate your comments.

Sincerely, C. J. McMurtry.

CJMcM:wg

P. S.: Gene advises that we are approved at Chattanooga Electric Power Board, Nashville Electric Service and Memphis Light, Gas & Water Dept.

[fol. 5219] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 135

C. J. McMurry—Atlanta
J. R. Woods—Rome
December 10, 1958
Knoxville Utilities Board

Dear Mac:

The reports we have been receiving from you and others would indicate that the pricing basis on Bare and ACSR is pretty firm. Based on very recent reactions to one cut in price, I would have to assume that they will remain firm or a new sheet will come into being. This being the case, it would seem very desirable to be on the approved list with this customer.

If approval at Knoxville requires TVA approval, I would think that it would be well worth the time and effort involved. You must bear in mind, of course, that our ACSR capability is limited to those sizes which require a one steel strand core wire. In other words, our approval from TVA would be a partial or limited approval. I can foresee no reason why an unfavorable report would be rendered by TVA engineers, particularly in view of the fact that we process our own aluminum from the pig and also our years of experience in the manufacture of overhead conductor. I think we should actively pursue the TVA approval.

Very truly yours,

JRW:reh

[fol. 5220]. IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 136

cc: J. R. Woods, E. C. West

January 19, 1959.

Mr. Harry H. Hicks, Supervisor
Electrical Section
Tennessee Valley Authority
Chattanooga, Tennessee

Dear Mr. Hicks:

Thank you for your letter of January 15th in regard to inclusion of our name on your mailing list covering ACSR cable.

Our aluminum cables are manufactured at our Rome, New York plant and the name of the contact would be Mr. J. R. Woods, Sales Manager for Utilities.

Sincerely yours, —, —, Southern District Manager.

C. J. McMurtry/wg

Dear Jack:

Please see your letter of December 10th under subject of Knoxville Utilities Board. I immediately wrote TVA and have just received comments they will probably have people making an inspection trip in the summer or fall of this year.

Sincerely, —, —.

CJMCM:wg

[fol. 5221] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 137

cc: Stew Johnston—Chicago

R. R. Davis—Kansas City

J. R. Woods—Rome

December 24, 1958

Iowa Power and Light Co., Des Moines, Iowa

Dear Bobby:

I think I can answer your questions in your memo of December 22nd as follows:

1. Yes, I believe it would be attractive for us to pursue this customer to the tune of 20,000 ft. of Carp and a little weatherproof per month. I don't think we can ever afford to overlook this type of business which when all added up is really the backbone of our production.

2. This question requires a little crystal balling that neither of us are capable of at the moment. I don't think that we really expect anyone to give you an unqualified statement to the effect that we will be competitive regardless of the going price. I might mention in this regard that there was a time prior to going to the 15 and 7½% discount when we had to face up to the issue of either going to it or going out of the business. As bad as that price level was we elected to meet the going competition. I think our investment in our future is so tied up with aluminum that we will continue to make this decision even if it hurts our pocketbook in the worst way. Naturally, of course, this is a decision that is made on a higher level and I can only recommend that we ride the roller coaster and I assume that my recommendation would be honored. The only thing that would keep us from going along with a particular customer like this would be a situation where many of our big customers were willing to pay the sheet price or a modest discount from it and a small account like this demanded something better. We always have to look at these situations pretty closely because we think we are darn fools to spoil our situation with the big people for the sake of maintaining

good relationship with a distributor and a very small amount of business with a utility. Previous history has shown that a situation like this doesn't exist very long because somebody does what we think we are darn fools to do and everybody gets the lowest price. There is, however, in this example, a period of time when we are not competitive. I might say that the current aluminum price situation looks better than it has for a very long time. I mentioned the story in Chicago but I will repeat it again here that for the last several months aluminum prices were very firm. We were only able to detect two cases of cut prices, both of them being on a public bid. The ink was not even dry on these quotations when Kaiser reduced the price to the level quoted on the public bids. If this is an indication of their state of mind and we believe that it is, [fol. 5222] then it would be logical to assume that as soon as anyone quotes at a price other than the correct list, we will immediately have a new list corresponding to the cut price. I, of course, cannot give you a certificate to this effect but I think it is logical to assume that that is exactly what will happen. In other words, I think that the aluminum industry has got its back up on this cut price situation and they are going to either straighten it out or die in the attempt. If you can accept this as fact, as I do, then I think it is safe to say that we will be able to keep this customer competitive. I have given you all the facts that I have at hand and I think that they are sufficient for you to make up your own mind as to whether or not you want to commit yourself to keeping this customer competitive. Personally, I think it is worth the chance and I would suggest that you do so.

Very truly yours, —, —.

JRW:reh

[fol. 5223] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 138

Mr. A. J. Stewart, Massena

May 11, 1955.

Coffin—E.C. Gen.

L. H. Hemeter, Pittsburgh Office

District Managers—Aast. Managers
Branch Managers—Cable Salesmen

Supervisors—Product Managers

R. V. Davies	H. L. Hall
F. L. Magee	N. M. Kehew
D. Wilmot	B. S. Henderson
R. B. McKee	J. W. Hood
J. P. Haight	L. N. Grier
A. P. Hall	R. L. Phifer

Massena

J. H. DeKlyn	A. J. Stewart
Lee M. Arbogast	H. S. Marando
H. D. Lockhart	C. Weegar
D. L. Mayne	Wm. Hall
P. H. S. Chapman	H. E. House
T. L. Gilbert	R. R. Myers

Vancouver

E. D. Mairs	J. P. Lamoureux
J. T. Barclay	D. Barney
H. E. Young	

New Kensington

R. R. Cope	R. C. Kasser
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O ELECTRICAL CONDUCTOR DIVISION NEWSLETTER

The rate of production of bare cable during April showed but little change from the previous month. There was a 4% increase in aluminum weight, but the mills have ample capacity to enable them to step up their activity. Idle equipment means fewer jobs and reduced profit—neither of which is desirable.

Covered conductor activity, although not all that we hoped for, was, at least, fairly good. April bookings, although equal only to 70% of those for March, were 118% above the corresponding month of last year. Shipments were 27% greater than for March and 75% above April of 1954. New orders dropped to 72% of the March totals

but were 21% above the corresponding month of last year.

Comments have been made occasionally concerning our covered conductor business. It is true that we started from scratch in 1952 and there was only one way we [fol. 5224] could go—forward. I feel sure, however, that you will all be interested in the *rate* of advance as shown on the attached chart.

Most of you peddlers started selling conductor when, except for very limited quantities of weatherproof, everything was bare. Orders for bare cable often total a million pounds or more, and there is a real satisfaction in wrapping up a job of that size. However, to concentrate on bare cable and pass up covered would be a great mistake. From a profit standpoint, covered conductor means more to us than bare. Last year shipments of covered conductor in our district sales offices varied from 15.8% of the total down to a measly 0.016%. If we all work harder for this business, we can certainly show that the estimated rate of increase was established by a pessimist. Utilities usually buy covered conductor in moderate quantities just like we buy our bread and beans at the grocery store. If we can get them to do this weekly shopping with us, there is no reason why our sales of covered will not, within a few years, approach that of bare.

The aluminum weight of bare cable orders received during April showed a 10% increase over March and a 29% increase over April of last year.

The orders for 100,000 pounds or more aluminum weight are as follows:

Customer	Aluminum Weight—Pounds
Consumers Power Company.....	122,212
Dakota Electric Supply Company.....	134,789
General Electric Supply Company.....	247,884
Graybar Electric Company.....	1,188,083
Ohio Power Company.....	288,086
Pacific Gas and Electric Company.....	247,667
Priester Supply Company.....	106,243
Southern California Edison Company.....	282,725
U.S. Department of the Interior.....	1,830,715

[fol. 5225] In our March Newsletter we told you that more accessory orders were needed. Massena sat ablinkin' like a toad in a hail storm watching for them to

come in—but no soap. The result was that the Accessory Finishing Department was cut down to one shift as of April 11.

Bus as today's price should be as sought after as a buss from your best girl. There is activity in several sections of the country and Ray Campbell and Art Craig keep rooting up generator lead business just like young shoats in a pinder patch.

Chuck Appel started the wheels rolling with City of Seattle on the Duwamish Substation, and Buz Carleton took over when Chuck moved to New York. Because of teamwork between the Sales Department and Slim Mathews, Bob Wachter, and Wally Porter, in the Operating Department, we obtained an order for 22,000 pounds of bus and 25,000 pounds of structural material for the substation structure. Incidentally, they will also use our cable in the station.

All over the country large new buildings are being designed and constructed. These buildings will require bus duct, and we want Alcoa aluminum to be used. If you are not obtaining information from our architectural salesmen relative to these jobs, you are missing a good bet. They not only know what projects are in the wind, but they also can give you the name of the architect who will specify the kind of bus to be used. As an example, the University of Pittsburgh Schools of the Health Professions building was designed by a Chicago architect who specified copper bus duct. The electrical contractor wanted to use aluminum. Jim Holloman and Hal Kelly called on the architect and were successful in having the specifications revised to permit the use of aluminum bus. Phil Collins then got busy with the electrical contractor who called his source of supply for the duct and specified that the aluminum bus be Alcoa. Just another case of bringing the bacon home through cooperation.

[fol. 5226] It is surprising how far and to what extremes people will sometimes go in order to accomplish some desired result. At times they show as little judgment as the man in a no-limit poker game who backs a pair of treys against a royal flush.

Two customers recently built lines of 4/0 ACSR. Be-

cause they wanted to use a Burndy Y34A hand compressor for installing the joints and dead end assemblies—they had purchased Burndy joints—they had our Cat. 1875.2 dead end bodies and Cat. 975.2 jumper terminals turned down on a lathe to give them the same OD as the Burndy joints. Skip bites were used on the jumper terminal and part of the dead end body; *no compressions were made on that part of the dead end body between the lug and clevis.* We assume skip bites were also used for compressing the barrel of the steel clevis end. We will have a definite answer to this before long.

If anyone is planning a similar installation and asks you about it, tell them it is plain lousy. Mechanically this construction is probably good for about 35% of the ultimate strength of the conductor. We will make electrical and mechanical tests later.

A few years ago there was some demand for a loop dead end that would accommodate cables larger than 2/0 ACSR, but we did not have an opportunity to develop one at that time. A Cat. 414 loop dead end suitable for 3/0 and 4/0 ACSR as well as 4/0 and 266,800 cm All-Aluminum is now available and can be shown in white data provided there is an appreciable market for it. Please let Mr. Dallye know your thoughts concerning this Cat. 414 for he does not want to authorize a stock at Massena or Vancouver unless there will be enough demand to justify production.

[fol. 5227] A few months ago we issued a brochure on our 12-ton compressor Model 12A. The pictures in this brochure showed the press without insulation on the body and handles, and the tables did not show the complete range of cable sizes that it will accommodate. The questions that you should answer for Mr. Dallye are:

1. Do you feel that the brochure is satisfactory in its present form or should it be reprinted using new pictures and revised tables?
2. Has it done any real good?
3. When the compressors are in the hands of our distributors, will having a supply of these pamphlets available to them be of much sales value?

We do not want to reprint the brochure unless it helps in our sales efforts, because we have a fairly good stock of the pamphlets on hand.

Through the years we have referred to our supervisors as cable supervisors. As a result some feel that their work is confined to bare cable. This is not the case. The supervisors are interested in and work with conductor of all types—bus and covered cable as well as bare.

The word "supervisor" does not fully describe the work they do, and we hope before long to use another term that will be more appropriate and more descriptive of the work they do. We have a number of ideas we are mulling over, and invite your suggestions.

The returns are not completely in for April, but March was the whoppingest best month yet for our agents and distributors. The comforting thought behind this is that every pound of this business is at schedule prices, and our distributor and agency organization is operating "in the black".

However, April will go down as the month of "wash sales"—sales "washed" through consignment stocks in [fol. 5228] stead of being entered as agency sales. We cannot blame a distributor for wanting to make more money—that is his business—but we strongly censure the Alcoa salesman who permits the distributor to line his pockets with unearned, good Alcoa dollar bills. Our commissions and discounts have set a standard in the industry for fairness, and it ill behooves us to condone reception by "washing" agency sales through a consigned stock just to allow the distributor a larger discount or more margin with which to cut his price! We must all be constantly on the alert to short circuit any of these deals. Our contracts are specific in this respect, and we shall continue to scrutinize and refuse to accept in Pittsburgh those consignment orders which should be entered as direct shipments to distributor's customers.

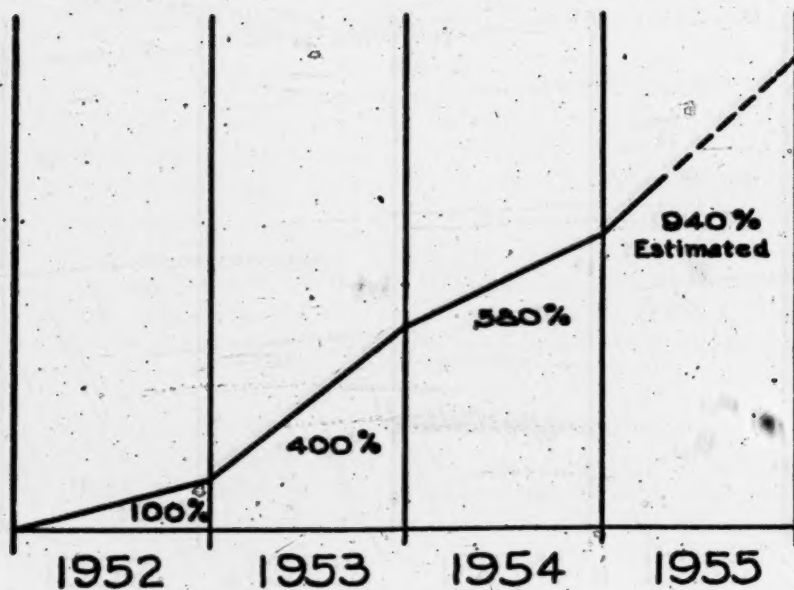
L. H. Hemeter.

LHH/elj

CC: Mr. P. T. Coffin, Mr. H. H. Rodee, Mr. F. R. Dallye, Mr. Dixon Lewis, Mr. G. H. Phillips, Mr. L. T. Guess, Mr. D. H. Sandell, Mr. R.E. Larson, Mr. L. L. Flaughter, Mr. Donald Paro, Massena

[fol. 5229]

COVERED CONDUCTOR SHIPMENTS



[fol. 5230] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 139

February 23, 1955.

Philip T. Coffin,
Pittsburgh Office
Mr. J. P. Haight,
Pittsburgh Office

Re: Polyethylene Covered Conductors

For several months we have been watching the bookings, production and shipments of polyethylene covered conductors very carefully. It has been our thought that quite probably the time may have arrived for Alcoa to enter that field of production. We have now concluded that we should make a detailed study of the problem and arrive at a definite decision. A number of factors influenced our thinking and we believe it may be helpful to all concerned if I enumerate those factors:

1. Since our entry into the covered conductor field almost exactly three years ago via the medium of toll covering by Rome Cable Corporation, our business has increased (for all types of coverings) from zero to a predicted volume of somewhat over four million aluminum pounds for 1955. Despite two devastating price wars in electrical conductors during this period and despite our inherent "profit sharing" with Rome Cable Corporation, we have sold well over four million pounds of cable which we could not otherwise have sold, and at a profit.
2. Of the three predominant types of coverings—neoprene, polyethylene and textile, in that order—polyethylene appears to be running the best race. We estimate our conductor sales with that type of covering at about two million aluminum pounds for 1955.
3. Equipment costs and "know how" with respect to polyethylene are both much more favorable to the [fol. 5231] newcomer in the field of covered conductors than they are with respect to neoprene. Textile coverings may be disregarded since they are running a poor third.

4. The increase in popularity of polyethylene coverings has taxed Rome Cable Corporation's facilities to the point that for the past several months Rome Cable Corporation has been offering extended deliveries to its own customers, including Alcoa. This has resulted in our losing considerable business and some prestige.
5. We have lost and will continue to lose quite a volume of covered conductor business from a number of utilities who take the stand that Alcoa's toll arrangement with Rome Cable Corporation is "parasitic", i.e., to paraphrase: "Alcoa has done nothing constructive in the development and improvement of covering technics or lowering of prices and is, therefore, not entitled to any share of the business."
6. The fact that Alcoa does no covering of conductors is detrimental to the morale of our sales force. There is a fundamental pride in selling Alcoa made products which we constantly discern in our salesmen and which can best be illustrated by unanimous plea of our conductor salesmen that "we get into the covering game ourselves."

Our dealings with Rome Cable Corporation have been mutually frank and above board starting with the inception of our present toll arrangement. The Rome officials have felt right along that sooner or later we would probably enter the covered conductor field and we have never denied [fol. 5232] the possibility or even probability of such a step. The proposed study, therefore, need not be kept confidential in any way.

Sometime ago Mr. Vincent Matthews did make a confidential study with the help of Cost Accounting and our people at Massena to ascertain in a rough way whether our present volume of business would justify our entrance into the polyethylene covered conductor field. At the time we felt that if the study were favorable, the information would be extremely helpful in any of our future discussions with the Rome officials. I don't know whether the study has come to your attention or not, but it indicated that even with our present modest volume of shipments we

should break even and that increased utilization of the newly acquired facilities should bring a very satisfactory return on the investment.

On Monday, February 21, Mr. R. V. Davies and I spent several hours with Mr. A. D. Ross Fraser, President, and Mr. Glen Rolston, Vice President in Charge of Sales, of Rome Cable Corporation. The entire subject was discussed with complete candor and Messrs. Fraser and Rolston understand that we are going to make a detailed study and advise Rome Cable Corporation of our decision as promptly as possible so that they in turn may either expand their facilities to take care of the additional production load which would be imposed by Alcoa, or to perhaps take any other steps which might result from our decision.

If the proposed study verifies Mr. Matthews' earlier study and the decision is made to enter the polyethylene covering field, we would continue our toll arrangement with Rome Cable Corporation on neoprene and textile coverings and with the larger sizes of polyethylene coverings until such time as our volume of business might justify steps toward complete independence in the field. I believe, however, that we will always find it expedient to continue the toll arrangement on certain sizes of conductors and types [fol. 5233] of coverings because of the relatively small demand for those specialties.

I shall appreciate your expediting this study within reasonable limits so that if there is a favorable ruling from Management, we can take steps as promptly as possible. I have no personal knowledge as to estimated delivery on equipment and number of other factors affecting the time element, but the Rome people think that something on the order of six months to one year would be required until we could be in production. I think that any saving in time which can be gained without undue sacrifice to other important matters will pay good dividends.

Philip T. Coffin.

PTC:ags

CC: Messrs. D. Wilmot, R. V. Davies, R. B. McKee, Harry L. Smith, Jr., F. L. Magee, J. L. Patterson, M. E. Brooks, T. H. Kerry, A. J. Stewart, T. L. Gilbert, Vincent Matthews, Jr.

[fol. 5234] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 140

July 11, 1955.

Philip T. Coffin,
Pittsburgh Office
Mr. R. V. Davies,
Pittsburgh Office

Re: Covered Conductors

Proposal for Alcoa to do its own Polyethylene Covering

In my letter of February 23, 1955 to Mr. J. P. Haight, I pointed out that there were a number of reasons for our giving immediate consideration to the proposition of Alcoa's producing its own polyethylene covered conductors, and requested that engineering and cost studies be made so that the matter could be investigated, and if sufficiently attractive, be referred to management for appropriate action. I attach a copy of that letter for your convenience.

On May 11th Mr. A. J. Stewart submitted a proposal for the installation of facilities at Massena for the production of covered aluminum conductors. I attach that proposal together with Mr. Stewart's covering letter. It is my only copy, so I shall appreciate its return in due course.

A number of conferences and discussions preceded the submission of the proposal, and as a result, it embraces a step by step program wherein we would start polyethylene covering at a modest level in 1956, increase polyethylene covering capacity in 1959, and also enter into neoprene covering in 1959—if we so elect. The proposal also embraces the installation, on a step by step basis, of equipment for twisting and testing triplex service drop conductors.

In my opinion, the proposal is well conceived and logical. It calls for a new building at Massena with provision for step by step building expansion, so that no unnecessary expenditures need be made ahead of actual requirements. Conversely, if the rate of growth

of our covered conductor business exceeds our expectations, the step by step program may be accelerated. That such a possibility exists is shown by a few facts and figures:

1. Alcoa's shipment of covered conductors of all types has grown progressively from 65,000# per month in 1952, to 132,000# per month in 1953, to 200,000# per month in 1954, to over 300,000# per month so far in 1955. 32.5% of 1954 shipments were polyethylene covered as compared to 44.0% thus far in 1955. Alcoa is presently enjoying about 8-10% of the covered conductor business.
2. A recent survey by *Electrical World* reveals that whereas reporting utilities show 46% use of aluminum service drops, they plan to jump to 64% in the near future. Corresponding percentages for secondary distribution lines are 36% and 53%. Many of the non-reporting utilities are "die-hards," who will only resort to aluminum when driven to that move by even stronger economic pressure. We know of several such utilities who are making studies and a good share of their covered conductor requirements alone would, or could double our present volume of business.

Our present belief is that our monthly shipments of polyethylene covered conductors should reach 160,000# per month by July 1956, and probably 200,000# per month by January 1957. Our cost accounting people estimate that if the first step of the proposal, representing a new expenditure of \$736,000 could be in operation by July 1956, the annual rate of return on the investment would be 13%. The 200,000# monthly level would correspond to a 17% [fol. 5236] return, and the 15 shift full capacity level of 292,000# per month a 26% return. The highest return we have reached on the present toll basis is 9%.

The several factors enumerated in my letter to Mr. Haight continue to grow in importance. Up to last fall we were able to roll with the punches when occasional order jams, equipment failures and miscellaneous reasons resulted in some loss of business or prestige. Alcoa has now, however, become so large a factor in Rome Cable's opera-

tions and in the eyes of industry that one bad incident—of whatever cause—could set us back very severely in the competitive position we are just now on the verge of enjoying. We are now getting “bloodied up” with fair regularity and even at the moment are taking steps to do considerable of our own triplexing at Massena on a makeshift basis for some months, and at loss of considerable revenue, because Rome Cable simply can’t handle the order load until new equipment—overdue, to be sure,—is installed.

History is bound to repeat, and with more violence. I, therefore, urge that prompt approval of the proposal be granted.

Philip T. Coffin.

PTC:ags

CC: Mr. D. Wilmot, Mr. R. B. McKee.

[fol. 5237] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 141

Mr. A. J. Stewart, Massena

July 29, 1955.

Philip T. Coffin,
Pittsburgh Office

Mr. John L. Patterson,
Pittsburgh Office

Read eight-three by Harper, Wirner, Tittle, Gilbert

Re: Covered Conductors

On May 11th, Mr. A. J. Stewart submitted a proposal for the installation of facilities at Massena for the production of covered conductors. That proposal has been carefully studied by a number of us in the Sales Department and I have just been advised by Mr. R. V. Davies that I have his approval to initiate a Request for Authorization based on that proposal.

The purpose of this letter, therefore, is to ask that the R for A be drawn up as promptly as possible so that when, and if, it is approved the work may be undertaken in time

to avoid winter weather conditions and thus more quickly put Alcoa in the business of covering at least a portion of the covered conductors it is selling at an accelerated pace. I understand that quick action will also result in considerable savings in construction costs.

A number of conferences and discussions among members of the Sales, Operating, Engineering and Cost Accounting Departments preceded the submission of Mr. Stewart's proposal, and as a result, it encompasses a step by step program wherein we would commence polyethylene covering at a modest level in 1956, increase capacity for that operation in 1959, and also enter into neoprene covering in the same year—if we so elect. The proposal also embraces the installation, on a step by step basis, of equipment for twisting and testing triplex service drop conductors. In short, the proposal avoids the expenditures of any funds, other than those needed for the initial step, until the volume of business and profits clearly demonstrate the need and justification for each successive step, each of which may be accelerated if necessary. That there is a strong possibility for the need of such acceleration is [fol. 5238] shown by a few facts and figures:

1. Alcoa's shipments of covered conductors of all types have grown progressively from 65,000 pounds (aluminum) per month in 1952, to 132,000 pounds per month in 1953, to 200,000 pounds per month in 1954, to over 300,000 pounds per month for the first six months in 1955. June shipments were 338,000 pounds. 32.5% of 1954 shipments were polyethylene covered, as compared to about 44.0% thus far in 1955. There is a pronounced trend in favor of polyethylene over neoprene, although the latter apparently will always have a sizeable group of adherents.

2. A recent survey by *Electrical World* reveals that whereas reporting utilities show 46% use of aluminum service drops, they plan to jump to 64% in the near future. Corresponding percentages for secondary distribution lines are 36% and 53%. These increases in the amount of use tell only part of the story, for there is also a very noticeable increase going on in the size of both service drops and distribution conductors. Many of the non-reporting utilities are "die-hards," who will only resort to aluminum

when driven to that move by even stronger economic pressure. We know of a number of such utilities who are making studies and a good share of their covered conductor requirements alone would or could double our present volume of business. One such utility was "converted" only last week and placed initial orders for 5,000,000 ft. of line wire, of which we received about 40%.

3. Repercussions of the strike at the plants of the Kennecott and Phelps Dodge Copper companies have become so serious that at least one copper wire company has ceased to accept any more orders until further notice. According to current newspaper reports, there will be a copper shortage of major proportions for many months after the cessation of the strike, so quite obviously there will be much more impetus to the swing over to aluminum covered conductors. The swing over to bare aluminum [fol. 5239] conductors is, of course, a matter of history.

Our present belief is that our monthly shipments of polyethylene covered conductors should reach 160,000 pounds per month by July 1956, and some 200,000 pounds per month by January 1957. Our cost accounting people estimate that if the first step of the proposal, representing a new expenditure of \$736,000, could be in operation by July 1956, the annual rate of return on the investment would be 13%. The 200,000 pounds monthly level would correspond to a 17% return, and the 15 shift full capacity level of 292,000 pounds per month a 26% return. The highest return we have reached on the present toll basis is 9%.

The several factors enumerated in my letter of February 23, 1955, to Mr. J. P. Haight continue to grow in importance. We have now become so large a factor in Rome Cable's operations and in the eyes of industry that one bad incident, such as a major equipment failure at the Rome plant, could set us back very severely in the competitive position we are just now on the verge of enjoying. Rapid entrance into our own covering operation would largely remove such a threat. We are currently going through a bad period in our toll arrangement with Rome Cable because Rome simply can't handle their own and our combined order load. This situation is temporary in nature

because of the delay in new triplexing equipment for Rome Cable which has been on order for some months, but the same situation may very easily repeat and with more violence.

Philip T. Coffin.

PTC:ags

CC: Messrs. D. Wilmot, F. L. Magee, R. V. Davies, R. B. McKee, H. L. Smith, Jr., J. P. Haight, M. E. Brooks, H. L. Hall, A. J. Stewart.

[fol. 5240] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 142

January 4, 1957.

Philip T. Coffin,
Pittsburgh Office
Mr. R. V. Davies,
Pittsburgh Office

Re: Rome Cable Corporation

I call your attention to the contents of Ross Fraser's letter of December 16th addressed to you as well as the contents of my letter of November 21st, 1955, to Glenn Rolston. As I interpret Ross Fraser's letter, the January 1st, 1957, date which I suggested to Glenn Rolston has been extended to May 1st, 1957, by means of Ross Fraser's letter. In other words, we would be free to make other arrangements with respect to neoprene covering any time after May 1st, 1957, unless the agreement is extended by mutual consent.

So far as a meeting with Ross Fraser, and I suppose Glenn Rolston as well, is concerned I am pretty well tied up on January 9th, will be at Massena on January 10th, and am again tied up on January 13th all day. I shall be in New York attending the AIEE Convention January 21st through 24th. I will try to avoid any further commitments until you have set up a date with Ross Fraser.

Philip T. Coffin.

PTC:ags

[fol. 5241] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 145

CC: Mr. L. H. Gray

December 6, 1956.

Earl B. Cox,
Cincinnati Office
Mr. P. T. Coffin
Pittsburgh Office

Electrical Conductor Sales Meeting

December 17-18, 1956

Our number one interest is the competitive price situation. We haven't been bothered very much in the bare conductor sales in our district so far this year, but have heard some serious rumblings recently. The bad situation in covered conductors still exists. The going rate is 5 to 10 per cent under our book price in this area. Are we planning to expand our covering facilities at Massena and go after it?

We are very much interested in Alcoa broadening its field of endeavor in the Electrical Conductor Industry. You know we have expressed our thinking on aluminum magnet wire application. We are also interested in seeing Alcoa take on insulated wire, building wire, welding cable, and other electrical applications. You are well aware that some of our competitors such as Kaiser are already producing some of these products in aluminum. Is Alcoa planning to do so? We hope Alcoa plans to continue to be the leader in the Electrical Conductor Field. In order to do that, we believe Alcoa must get into these other applications.

We are interested in the latest bus conductor situation. Are there indications of price cutting in that field? You probably know that Kaiser has tried to get in with G. E. in Cincinnati by offering them sawed plate bus conductor with a rolled edge at \$.457 per pound. This is \$.02 lower than our No. 2 EG alloy in 2,000 lb. lifts and is causing interest. We understand now that Kaiser admits they can

not do it. Our total with G. E. in 1956 is now past the [fol. 5242] 500,000 lb. mark. They plan to buy 1,000,000 lbs. in 1957 and we expect to get 80 per cent of that.

How is the program of bus conductor stocking at distributors progressing? As you know, Williams & Co., Cincinnati, is stocking 18 sizes of No. 2EC-T6 bus conductor. They have sold 40,000 lbs. since starting in August of 1956. We are estimating they will sell 200,000 lbs. in 1957. This compares to a tonnage of 500,000 lbs. of copper bus in 85 different sizes, sold in 1956. This includes sales through their Columbus, Ohio warehouse. The Williams people expect to be selling this much aluminum bus in the next three or four years.

Earl B. Cox.

EBC:gl

Earl—Very good. Do you have sizes?

Yes.

Guy
L. H. G.

[fol. 5243] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 146

Alcoa

First in Aluminum

Aluminum Company of America
1501 Alcoa Bldg., Pittsburgh 19, Pa.

Master File Copy

For Further Information: William R. Shields,
Atlantic 1-4545, Ext. 467

For Release Wednesday, February 27, 1957 or anytime thereafter

Pittsburgh, Pa., February 27, 1957—Aluminum Company of America, long a supplier to the electrical conductor field, recently opened additional sales and use potentials with another new product—polyethylene-covered aluminum conductor. Simultaneously, Alcoa disclosed the fact that a completely modern covered conductor department at its

Massena (N.Y.) works is now in full operation, marking the first time the company has fabricated its own line of conductor covered with polychemicals.

Since making its first shipments in December, Alcoa has progressively stepped up production of covered conductors to the point where it has built up ample stocks and is in position to supply customers with covered conductor and service drops of the best quality and design available.

The plant's new equipment will cover single wires and stranded conductors in a large range of sizes. The finished product consists of wire or cable, covered with a relatively thin layer of protective and insulating polyethylene. [fol. 5244] In the process, cable is unreel as it is fed through straighteners into an extruded head. Here the conductor gets its coating of polyethylene. Thickness varies with customer specifications. The covered conductor then passes through a controlled cooling unit which gradually reduces its temperature. After running through a series of pulling wheels, it undergoes thorough electrical testing before being wound into coils or reels for shipment.

This production method produces two similar products—line wire and phase wire. Line wire is single conductor distribution cable. Phase wire is a component of a twisted product, containing two or more conductors, and is employed in low-voltage, self-supporting secondary circuits and service drop cables.

To insure maximum quality control, both coils and reels of service drop are immersed in a test tank, where they are electrically tested for imperfections in the covering. Rejected reels are taken from the production line for further inspection and repair, if feasible. Those passing this final test are then carefully packaged for shipment.

[fol. 5245] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 149

November 8, 1957.

Minutes of Fall Meeting of Subcommittee on Electrical
Conductors September 11-12, 1957

Conference Room—Alcoa Research Laboratories
Massena, New York

The following written reports were sent to the Members
of the Subcommittee prior to the meeting:

Development Trends and New Applications—Mr. R. R.
Cope, August 26, 1957

Production Situation—Mr. C. L. Kessler, August 26, 1957

Electrical Uses of Aluminum in Alcoa Plants—Mr. L. N.
Grier, September 5, 1957

Review of Investigations at Alcoa Research—Messrs. Hart-
mann, McKee and House, September 3, 1957

Review of Investigations at Massena Works—Mr. C. L.
Kessler, August 31, 1957

Mr. E. C. Hartmann, Chairman, called the meeting to
order at 1.30 p.m. The following Members were present:

Members Present:

Mr. E. C. Hartmann, Chairman,

Mr. P. T. Coffin,

Mr. R. R. Cope,

Mr. F. R. Dallye,

Mr. L. N. Grier,

Mr. L. T. Guess,

Mr. H. E. House,

Mr. C. L. Kessler,

Mr. W. E. King,

Mr. J. S. Tompkins.

Visitors Present:

Mr. G. D. Welty, Chairman Technical Comm.,

Mr. J. H. DeKlyn,

Mr. E. G. Schoeffel,

Mr. N. B. Lane,

[fol. 5246] Mr. N. T. Bond,
 Mr. H. H. Caldwell,
 Mr. H. C. Dameron,
 Mr. E. T. Engelhart,
 Mr. L. C. Getsinger,
 Mr. T. L. Gilbert,
 Mr. A. C. Heath,
 Mr. L. H. Hemeter,
 Mr. A. E. Jennings
 Mr. E. K. Lancetot,
 Mr. W. F. Madden,
 Mr. H. S. Marando,
 Mr. G. H. Phillips,
 Mr. C. B. Rawlings,
 Mr. W. D. Stewart,
 Mr. P. E. Stickley,
 Mr. T. E. Simpkins,
 Mr. O. F. Turner,
 Mr. P. D. Tuttle,
 Mr. J. C. Yedlika.

The minutes of the Spring Meeting were approved without changes.

Mr. A. J. Stewart, Member of the Subcommittee, who has been recently transferred to Cressona, expressed his regret, in a letter to Mr. Kessler, at being unable to attend the Meeting. The Subcommittee expressed appreciation for Mr. Stewart's services.

I. Market Conditions and the Competitive Situation

Mr. Coffin discussed market conditions and the competitive situation. Although there is a good volume in Electrical Conductor sales, because of the price war which is believed to be the worst yet experienced, it is practically impossible to make a fair profit on Electrical Conductor products. Alcoa has one important asset, built up over the years of experience, to come out with new ideas and devices. This is especially true in conductor accessories. The outlook for future demand in electrical conductor products is very bright, for the use of electricity in the United [fol. 5247] States is approximately doubling every ten years. This of course calls for new construction and the

use of covered electrical conductor and accessories in addition to stranded conductors used for overhead transmission lines; bus conductors have become a very important phase of our operations. The use of sheet or foil for coils is expanding more and more as time goes on. Mr. Coffin stressed the importance of new ideas in the field of electrical conductors. He pointed out that the Members of the Subcommittee are well fitted to make valuable contributions along this line, with the consequent aid to sales. Mr. Lane raised the question as to the prospects for future business, and Mr. Coffin replied that with the expected growth in consumption of electricity that the volume for EC aluminum for 1957 should exceed the 250,000,000 lb consumption for 1956. This figure was released by the Department of Commerce, and it is estimated that 200,000,000 lb of this went into overhead electrical conductors. Mr. Welty raised the question as to the expected effect of the recent price reductions in copper on the aluminum conductor market. Mr. Coffin expressed the opinion that most authorities expect the price of copper to increase above the 25 cent per pound present price. It takes two pounds of copper to get the same current-carrying capacity as one pound of aluminum. Copper does have the advantage of lower fabricating costs than aluminum. The price of copper would have to drop to about 12 cents per pound, to make serious inroads into the electrical conductor market. The use of copper is coming back into the picture in the use of magnet wire and small transformers.

II. Development Trends and New Applications

Mr. Cope opened his remarks by stating that the present [fol. 5248] price of copper has not discouraged the activities in his division in extending the use of aluminum by electrical manufacturers. It is appreciated that the present low price of copper may prolong many activities and postpone switches from copper to aluminum in many products which require considerable fabrication, such as bunched conductors, but that eventually aluminum will be used in these products. None of the manufacturers expect the price of copper to remain at the present level. One important field in the development of the use of aluminum is strip or foil windings for transformers, relays, and simi-

lar apparatus. The Commercial Research Division has recently completed a study which estimates 200,000,000 lbs of aluminum will be consumed in the manufacture of windings using foil or strip. This type winding has a much better space factor than the winding made of wire. Provisions are being made at New Kensington to wind prototype coils made of foil to customer specifications. Methods are being developed to insulate effectively between turns and also methods to prevent short circuits at the end of the coil when large coils are sliced into smaller coils. A sales training program is planned to enable salesmen to sell foil and strip for magnet wire applications. This program is backed by the Technical Committee, the Capacitor Foil Committee, the Aluminum Process Development Laboratories.

Last June a meeting was held in Philadelphia to promote the use of aluminum in busway, which was attended by 168 people. This group consisted of architects, contractors, consulting engineers, distributors and other interested parties. Plans are under way to hold similar meetings in Los Angeles and San Francisco.

[fol. 5249] Edward Ashley and Associates have completed their study on the use of aluminum in the building industry. The report is quite extensive, and will be presented to a group in Pittsburgh on September 19. This study covers the use of aluminum, not only in electrical conductor, but such items as conduit, metal enclosures, switch boxes and so forth. They also made a survey of contractors to learn their thinking on the use of aluminum in the building industry. Edward Ashley and Associates are the consulting engineering firm who did the Alcoa Building and the office building at the Davenport Works.

III. Production Situation

Mr. Kessler reported on the production situation at Massena. There is quite a large forward tonnage for Expanded ACSR on the books, but for standard types of ACSR the future appears to be uncertain at the moment. There is quite a backlog of armor rods; there is quite a heavy load of both tapered and straight armor rods. About 140,000 sets of Alcoa armor rods were sold, compared to 23,000 sets preformed armor rods. All of the equipment author-

ized by the Committee for the Covered Conductor Department has now been installed. Operations are proceeding satisfactorily, each month production is becoming more efficient, costs are improving nicely.

At this point Mr. Kessler asked Mr. Jennings of the Massena Cost Accounting Division to review the cost analysis of the Covered Conductor Department. Production was begun in November 1956. Production has increased steadily and costs have been reduced. 236,000 lb aluminum weight, covered conductor was produced on the average [fol. 5250] the first six months of 1957. Mr. Jennings presented charts comparing Massena production costs for covered conductor compared with covered conductor made for Alcoa by Rome Wire and Cable Company. Each successive month showed improvement in Alcoa cost figures. It was pointed out that Rome costs include profit for Rome, and Massena costs are expected to get still lower so that the margin of profit will be better. Mr. Guess said that it would be easier to analyze the operations if the costs were broken down so that direct comparison between our operations and Rome could be made for separate items. Mr. Kessler pointed out that the starting material costs of bare conductor was the same whether we covered at Massena or whether Rome covered it. It was agreed there is still room for considerable improvement in reducing Alcoa costs of covered wire. Mr. Kessler reported that the initial troubles which were experienced in covering 600 volt conductor were overcome.

Recently an inquiry was received from the Long Island Lighting Company for #8 Conductor insulated with 110 mils Polyethylene. A quotation was not made on this item because the test equipment required to meet the 11,000 volt a-c and 33,000 volts d-c test is not available at Massena. The present maximum a-c test voltage is 5,000. \$8,000. would be required to increase a-c test voltage to 20,000 volts. Mr. Kessler asked for an expression of opinion from the committee on the advisability of securing this necessary test equipment to meet such specifications. Mr. Coffin and Mr. Guess both expressed the opinion that we would not be justified in purchasing this equipment at this time. Perhaps later on when we have more experience in this field we could branch into the higher voltages. Mr. Grier

pointed out that with higher voltages, more problems would [fol. 5251] be encountered, one of which is shielding, and it appears that until all the problems are successfully solved in the manufacture of 600 volt class conductor, higher voltage conductors should wait. It was agreed by the members of the Subcommittee that this is the course that should be followed, and no high voltage test equipment should be purchased at this time.

There are now 330,000 lbs, aluminum weight, of covered conductor scrap which have to be salvaged. Recently, the amount of scrap received per month has exceeded the amount reclaimed. An engineering study indicates that about \$10,000 would be required for new equipment to adequately take care of scrap. Mr. Kessler inquired of Mr. Coffin if it would be the continued policy for Alcoa to take customer scrap for reclaiming, and Mr. Coffin replied that this would be a necessity to maintain customer relations. Methods of reclaiming scrap were discussed, and it was pointed out that a great deal of scrap comes in briquettes, which is Polyethylene and Neoprene mixed, in which case the only method practical is by burning. In the case of long lengths the insulation can be stripped. It appears that both methods of reclaiming scrap will be necessary. Polyethylene scrap can be reused, neoprene cannot. It was recommended by Mr. Coffin that suitable scrap handling facilities be provided.

About 756' non-returnable reels are being shipped each month. There has been a big demand for non-returnable reels, although some customers do not ask for them. Mr. Turner reported that Vancouver is going to have some 66" reels on experimental basis, of the non-returnable type.

Mr. Phillips reported that non-returnable reels had been quite successful even when used in very rough terrain in [fol. 5252] new line constructions. Mr. Kessler reported that 50 96" aluminum reels were on order and scheduled for shipment in November. These reels are made of 6061-T4 aluminum alloy. It is planned to use these reels for expanded conductor. An economic study will be made comparing aluminum alloy reels and steel reels to determine which is the more economical. Recent shipments received of returned wooden reels at Massena showed 48% had to be scrapped. The returnable type wooden reels are only

averaging about two trips. Mr. Kessler reported that the August 1st inventory of 84" reels in steel, was 1,117. These reels cost about \$200. each. The reels occupy two Massena Works Smelting Plant buildings for storage. Mr. Kessler asked for an expression from the committee as to what should be done with the reels. Mr. Coffin pointed out that 300 had been sold to Kaiser after they had been used for two years. Steel reels at Vancouver are even a greater problem than at Massena because of the lack of indoor storage facilities. The reels must be painted every time they are sent out. Mr. Coffin spoke of the various tests for mechanical strength and corrosion, and the aluminum reels had passed these tests successfully. It is believed these reels would be good for a minimum of twelve trips compared to a long time average for returnable wooden reels of only two and a half trips. The one question on aluminum reels is whether the customer will accept the full cost of the reel as a deposit. The Sales Department will investigate possible purchasers of surplus steel reels. Mr. Kessler pointed out that it would be quite helpful if the conductor salesman used every effort to get the customers to use steel reels, especially in view of the very poor performance of wooden ones. Mr. Coffin and Mr. Phillips both advised that this was being done.

[fol. 5253] Mr. Dallye pointed out the Massena production figures, comparing Alcoa preformed armor rod sales and Alcoa armor rod do not reflect industry sales of armor rods. A better comparison would be arrived at if we took orders for 6061 Redraw rod sold to the preformed armor manufacturers and multiply that figure by three. This would give somewhere near the total weight of preformed armor rods being sold. Mr. Dallye reported that several large jobs for tapered rods had been sold this year. Sales seem to be increasing in the large size rods and decreasing in the smaller size rods. Mr. Dallye said that approximately four times as many sets of preformed armor rods are being sold as Alcoa rods. Mr. Lane inquired if there was a possibility of improving the manufacturing process of tapered armor rods. Mr. Coffin and Mr. Dallye explained that the method of making tapered and preformed rods are quite different, but perhaps costs could be reduced.

At this point Mr. Kessler opened the discussion on the

need for bunching equipment at Massena. He stated that a number of different samples of fine wire had been supplied to the General Electric Company for bunching in their Asheboro, N.C. plant, and that the material had been in their hands since August. At the present time a satisfactory date to try out the different materials had not been established. The points in question concern the proper alloy and temper most suitable for bunching. The question as to the most preferable make of buncher was discussed and Mr. Kessler said that he believed the Watson buncher to be the type in general use. However, Mr. Coffin pointed out that the American Insulated Wire Company preferred the Cook buncher. It was reported that most of the trouble the American Insulated Wire Company had with Watson buncher was that the Watson buncher was in [fol. 5254] poor repair. Mr. Kessler stressed the need for accelerating the program with General Electric in order that we may evaluate what alloy and temper are best suited for lamp cord. Mr. Kessler expressed the opinion that it would be well to have the recommendation of the Subcommittee as to the need for bunching equipment so it could be mentioned in the R for A. Mr. Lane said that more facts should be presented concerning return on the investment of the buncher, such as supplying the company's own need for bunched wire, which is now purchased from outside sources. Mr. Coffin recalled that one of the manufacturers had offered to install a buncher on a free trial basis. However, it is unknown whether this offer is still open.

Mr. Cope raised the question if any progress is being made toward supplying American Insulated Wire Company with fine wire for bunching. Mr. Kessler explained that for American Insulated to bunch wire they require wire wound on forty-four of their own special spools. It is believed that until the G. E. trial has indicated the best alloy and temper it would be better to hold off on American. Mr. Cope said that American had offered to bunch some .006 wire if we supplied the wire. The opinion was expressed that if G. E. was going to continue to delay bunching operations that perhaps we should supply American with a supply of wire for bunching. Mr. Kessler stated that the problem of making wire was a minor one, the main prob-

lem was making arrangements with American to get their spools.

Supplying the company needs would be one outlet for initial production. The question was raised as to the price of the buncher and Mr. Kessler stated that it would be [fol. 5255] around \$15,000 installed. Mr. Coffin expressed the thought that this was probably too high and that someone had reported to him that a buncher could be purchased for \$1500. Mr. Kessler stated that the buncher is only a part of the equipment needed to manufacture bunched conductor. Auxiliary equipment is required. Mr. Kessler advised that he would review the quotations they had received after the last E. C. Meeting but that he believed his estimate was quite close. After checking with the Engineering Department Mr. Kessler reported that bunching equipment, exclusive of auxiliaries, costs between \$6,000 and \$7,000. Mr. Kessler said that additional equipment and installation expenses would run the total costs to approximately \$15,000 which is the estimate arrived at by the Engineering Department. This equipment would take care of control wire requirements down to lamp cords. It was pointed out that over \$36,000 worth of this type conductor is now purchased outside the company, which could be fabricated by our own works. Mr. Cope remarked that if we could develop a satisfactory method of making lamp cord it would open a tremendous market for aluminum. It would be expected that American Insulated Wire, General Electric, and others, would enter this market. Mr. Kessler stated that approximately 95% of the bunchers that are used today are Watson bunchers. The Cook machine is a very good machine but there are very few on the market. Most of our customers would be using Watson bunchers, which would be an advantage in having this type equipment.

Mr. Hartmann asked for an expression from the Subcommittee on the advisability of taking action on the purchase of a buncher so that when the R for A is prepared, this [fol. 5256] may be so stated. Mr. Tompkins raised the question of manufacturing control type cable with Polyvinyl Chloride covering, for use in company plants. Mr. Gilbert advised that to cover small wire necessitated additional extrusion equipment costing approximately \$45,000. A new extruder would also be required to make lamp cord

fixture wire. Mr. Dallye suggested that perhaps it would be better to wait until we found an aluminum alloy that can be successfully bunched. Mr. Coffin suggested that accurate estimates be prepared on the buncher plus other necessary equipment to turn out small insulated wires. It was decided that after the prices were determined Mr. Coffin, Mr. Cope, and other interested parties would get together and decide if the market potentialities justify this expense. Mr. Cope expressed the opinion that he didn't believe our uses of the extruder could be supported on the basis of fine wire and appliance cord. Mr. Grier inquired as to the smallest wire that can now be covered on the existing extruder, and Mr. Gilbert replied that #6 solid is the smallest size. Mr. Grier said that additional sizes that Alcoa buys, which could be made on the new extruder, in addition to No. 6, would be 8, 10 and 12 size wire. It was agreed, after questions by Mr. Welty, that the present price of copper makes the entrance of aluminum into the appliance cord field at this time economically infeasible. Mr. Kessler stressed that the program right now is to determine the proper alloy and temper so that the finished product will have the proper flexibility and will stand the stranding and other operations. Mr. Tompkins inquired if the surface treatment of bunched conductor is being investigated, and the answer was that it is.

IV. Electrical Uses of Aluminum in Alcoa Plants

Mr. Grier reported that the use of aluminum covered conductor in company plants was discussed last year and the general needs outlined for this type of conductor. The bulk of this conductor had been purchased from the U. S. Rubber Company before their covered wire manufacturing facilities were sold to Kaiser last spring. Massena has been in production of covered conductor for about a year. Most of the initial operating problems have been solved. The range of sizes goes from #12 conductor to 1,000,000 cm. Part of the company needs are being supplied by Rome, Okonite, General Cable, and others. Mr. Grier explained he was not satisfied with the source of supply. He reported that the rumor that Alcoa had placed a large order for covered conductor with U. S. Rubber, since this company was taken over by Kaiser, is untrue. Alcoa

did buy some accumulated stocks U. S. Rubber had on hand, with Alcoa aluminum conductor. Mr. Grier expressed the thought that he was looking forward to the time when all the company needs could be filled by Massena, and no orders would have to be placed outside.

Mr. Grier reported that high voltage switches of 23,000 volts class made of aluminum are on order with I. T. E. Circuit Breaker Company. Aluminum has very extensive use in bus work in company plants, and G. E. is turning out considerable aluminum switch gear purchased by Alcoa. Westinghouse has not developed their line to the same extent that G. E. has. Burndy has been the chief supplier of aluminum terminals for covered conductor, and Mr. Grier expressed the hope that we eventually might make all our own terminals. Terminals for small wire were formerly made at Richmond, and are now being turned out by a small independent manufacturing company in Covington, Kentucky. This supplier will eventually replace Burndy. [fol. 5258] Alcoa is now specifying aluminum terminals on transformers.

Mr. Grier reported high voltage cable failures at Davenport recently, where the aluminum shielding tape apparently caused the trouble because of corrosion. Mr. Grier displayed samples of the damaged cable. Sample shielding tape taken from storeroom stock, which had never been energized, was bright on one side and stained on the side next to the insulation. The cable was insulated with an oil base compound with a neoprene jacket. Mr. Coffin reported that before the shielding tape is applied the cable is given a tank test so that it is wet. When the shielding tape was applied that was probably the cause of the water stain. Mr. Grier pointed out that the failure could be caused by a combination of moisture and induced a current in the cable shield. This is a very serious problem and it is open to question whether aluminum shielding tape will be used unless the problem is solved. Mr. Coffin suggested that perhaps an alclad foil will give better service. Mr. Grier stated that if it was only a water stain he is not too worried, but if it is corrosion then it is a cause for real concern. Mr. Engelhart explained that water stain itself is a uniform formation of aluminum oxide, but that in corrosion some metal is removed. In his opinion this is

a case of corrosion, as there are signs of metal being removed. Mr. Gilbert explained that Rome did not use tank testing on shielded cable and for that reason it appears that the water stain theory would not hold up. Mr. Tompkins reported that the one cable that failed was Rome and one was Okonite. It was agreed that these samples of cable should be submitted to ARL at New Kensington for complete examination. Mr. Cope reported that efforts had [fol. 5259] been made to develop a market for aluminum shielding tape, and that it is quite important that this problem be solved. Mr. Cope expressed the opinion that Polyvinyl and Polyethylene insulation would be superior insulation to neoprene, as neoprene is fairly porous, and will admit moisture to the cable. This was confirmed by Mr. Engelhart. The question was raised about an Underwriters' approval of insulated cable made by Alcoa, and if this approval was necessary for use in company plants. Mr. Grier replied that this was the case in the States of Washington and California, where the Underwriters' code is mandatory. Mr. Cope expressed the opinion that we might want to get into this business and that it would be a good idea to make up some samples for tests by Underwriters. The question was raised as to the advisability of Alcoa getting into the business of insulated cable. Mr. Coffin was asked the question if he was considering selling insulated cable and he replied that we are not yet ready to enter into this business, which is totally different from bare conductor marketing.

V. Electrical Users of Aluminum by the Power Engineering Division

Mr. Tompkins reported that about 900,000 lbs of aluminum was being used in the Warrick plant. Aluminum includes all types of conductor, switch boxes, cubicles, conduit and so forth. Mr. Tompkins said that the new compression joint filler, Unoba A2 with tabular alumina, had been used at the Chilhowee project in Tennessee, and was quite successful. Consideration was being given to using some General Cable mineral insulated cable which they have developed. This cable would have aluminum conductor under the new type insulation. If turned out, however, that General Cable was not able to supply this new type

[fol. 5260] cable, and Mr. Grier pointed out that he had had the same experience when General Cable offered to make some for the Trinidad project and then were unable to do so. Mr. Grier said that the total use of aluminum at War-
 rick is about 6 pounds of aluminum per installed KW. Mr. Coffin recalled that slightly over 5 pounds had been consumed for non-electrical uses, that is, pounds per KW installed capacity. Mr. Tompkins said the figure was about 2,000,000 lbs for mechanical uses exclusive of electrical uses. Mr. Guess called attention to the fact that if we had been able to sell all of the plants in excess of 100 megawatts we would have sold approximately 120,000,000 lbs aluminum in 1956 for steam stations.

VI. Review of Investigation in Alcoa Research Laboratories, Messrs. Hartmann, Engelhart and House

Mr. Hartmann stated that if anyone present had ideas on priorities on any research projects, it would be very helpful if they would present them as the prepared report was reviewed. These projects are all covered in the detailed Progress Report of the Alcoa Research Laboratories, Dated September 3, 1957. [7-C-12].

Mr. Hartmann pointed out that when the scheduled tests [9-10338] on the mechanical properties of busconductor are completed an [9-10466] ARL Technical Paper should be prepared and distributed to bus [7-E-5, 9-10503] conductor users. Mr. Hartmann stated that because of budget requirements extruded and rolled bus are kept separate in the research projects. All the tests of mechanical properties of bus conductor are on "A" priority.

Next item for discussion was insulated Wire and Cable [7-E-7, 16-204] Mr. House reported that Job Order 16-204 [fol. 5261] had been completed [7-E-7, 16-204] and the other item on the Effects of Short Circuits had a B priority and no work had been done on it. The question was raised if the tests are still desired, and the general consensus was that the 7-E-7 item, "Short Circuits on Terminations of Insulated Wire and Cable", be removed from the Problem List.

Mr. Tompkins asked which of the Scotchlok Connectors [7-E-7, 16-357] are showing up the best. It was stated that the Type M is showing up a little better than the

Type R and that the Burndy KS90 seems to be better than either Scotchlok.

Burndy aluminum compression terminals installed with [16-346] experimental Alcoa dies in the Alcoa Model 60A compressor have been tested. The dies require further modifications for optimum results.

Mr. Bond reported it would still be several months [7-E-8, 16-149] before Job Order No. 16-149 covering the report of Bus Conductors in Stacks will be completed. There was considerable discussion concerning the advisability of having Mr. Lanctot's AIEE Conference Paper on Test of Bus Conductors published, and it was finally decided Mr. Guess would take it up with our publications department in Pittsburgh and that they would [16-324] take the matter up with AIEE and get the necessary reprints made, as there has been a good demand for this paper from customers and other interested parties.

Mr. House reported that a large test involving lap [7-E-8] joints of Bus Conductors has been under way for some time [16-222, 16-351] JO-16-351. Mr. Cope inquired if bus test, Job Order No. 16-222, included the various types [fol. 5262] of silver plating, Rapid Process, Powder Weld process and so forth, and it was stated that these would be included in the present Job Order 16-351. This mainly consists of aluminum-to-copper connections in an effort to develop a satisfactory connection for use in the Alcoa Potrooms. It was reported that the Alcuplate bimetallic wafer interposed between aluminum and copper contact surfaces, or joints with the aluminum silver-plated by the Powder Weld process were giving good results. Aluminum-to-aluminum and copper-to-copper were installed as control joints. All joints using grease type sealers between the aluminum and copper with or without metallic particles are continuing to show increased resistances. There was considerable discussion for the theoretical reasons why copper-to-aluminum joints present the problem not present in aluminum-to-aluminum or copper-to-copper. It was stated that Mr. Fred Keller believes that possibly there is some alloying taking place which causes increasing resistances. Mr. Tompkins expressed doubt and thought it was merely a difference of coefficients of thermal expansion. Mr. Cope showed particular interest in the aluminum

which had been silver-plated by the Powder Weld process. These joints are performing very satisfactorily. In general, where the surface of the aluminum can be successfully covered, the joint will give good performance. Mr. Tompkins inquired if any tests with No. 2 EC-to-copper were being made. It was reported that they are now on test with the No. 2 EC coated with silver by the Powder Weld process. It was reported also that tin-plating on the copper alone did not give a satisfactory joint, but that tin-plat-[fol. 5263] ing on both copper and aluminum has given satisfactory service. Mr. Hartmann raised the question if the joints using the bimetallic wafer should be continued, and Mr. Tompkins stated that this is being used in apparatus terminal connection at the Warrick steam plant. Mr. Hartmann reported that work was being done in New Kensington on flash-welded bimetallic connections between aluminum and copper.

Mr. Schoeffel reported that the Smelting Division [7-E-8] is considering installing Alcuplate wafers in the aluminum-[16-351] to-copper connections at the St. Lawrence plant. He estimated that over \$1,000 per year is being spent per potline in remaking joints. The use of No. 2 EC with copper was discussed and there was considerable discussion concerning aluminum-to-copper joints in potrooms. Mr. Tompkins expressed the opinion that silver-plated aluminum should be tested with copper. Mr. Schoeffel discussed the possibility of silver-plating aluminum bus in potrooms to which copper connections were made. Mr. Cope agreed to work with Mr. Schoeffel on various Powder Weld platings for Potrooms bus connections. It was reported that Handy and Harman of New York now have a silicone silver paint which they claim to be very successful, and that G. E. is very enthusiastic about it. However, considerable doubt was expressed as to the value of this type joint compound.

There was considerable discussion concerning relative [7-E-8, 16-75] creep rates of hard alloy aluminum and copper. It was pointed out that tensile creep tests showed the copper to be quite superior to aluminum alloys. Mr. Hartmann requested that E. C. Lab. data on compressive tests of bus bar stack comparing copper and high-strength [fol. 5264] aluminum alloy be sent in letter form to Mr.

Guess [7-E-8, 16-75] and Mr. George Stickley rather than wait for a formal report.

The "B" priority was assigned to Job Order 16-319, [7-E-8, 16-319] Tests of Potroom Aluminum-to-copper Button Type Anode Bus Connections.

A Job Order No. 16-250 Aluminum Washers of Different [16-250] Diameter and Thickness was removed from the Problem List.

Job Order #16-106, Tests on Sandow Bus was removed [16-106] from the Problem List.

There was considerable discussion concerning the advisory- [7-E-8] ability of additional tests on the 8" Extruded Integral Web [16-322] Bus with holes spaced at distances greater than 6". Mr. Guess reported that considerable integral web channel bus with holes drilled on 12" centers had been sold and is operating quite satisfactorily. It was decided to schedule no more tests on integral web bus at the E. C. Lab.

It was agreed that Mr. Engelhart would give Mr. Kessler [7-E-9a] a list of Massena-produced Polyethylene covered conductor [XE-157] for corrosion tests at New Kensington. It was decided to leave the tests of soldered and mechanical electrical connections and new floodlight circuit at New Kensington under test.

Mr. Coffin raised the question if the test for aluminized steel core wire had been put up to the ASTM for inclusion in [7-G-1] their Standards. Mr. Kessler advised that Messrs. H. H. Rodee [PK-20] and E. J. Holcomb are on this committee and Mr. Coffin agreed he would check with them.

It was decided to reexamine the present status of the [7-G-1] use of stainless steel core wire in ACSR and investigate any [XE-11] possible new types of stainless steel which may be available for core wire.

[fol. 5265] It was decided to discontinue corrosion exposure test [7-G-1] work on electrical conductor wire made from tilt mold ingot [XE-12] and the problem was removed from the Problem List.

It was decided to continue the test XE-17 of electrical conductor containing Boron.

Mr. Dallye reported that a meeting is scheduled for the 19th of September in Pittsburgh to be attended by inter-

[XE-154] ested parties to discuss the possibilities of securing Unoba #2 instead of Unoba A2. Recent tests using compound made with No. A2 have revealed that there is considerable bleeding of thin oil from the compound under pressure, which is undesirable. Mr. Turner agreed to find out if Unoba #2, as originally manufactured, is available on the West Coast.

It was decided that the program on filler (wine tests [XE-184] for Expanded ACSR would be discontinued for the present. Mr. Phillips reported that the filler now being used is apparently as good a product as we can obtain, and it was decided there would be no further work at present, but to keep on the lookout for any improved paper filler product. Mr. Dallye requested, and Mr. Hartmann agreed to exert efforts to have the word "Lub- [7-G-3] ricant" removed for protective coatings for ACSR products, as lubricating qualities are not of importance, and the protective properties are what are required.

Recent developments in the use of X-ray for the detection of strand failure was discussed. It was pointed out [7-G-4a.1, 16-203] that Mr. C. W. Cline, Physical Metallurgy Division, is actively following this in search of suitable equipment for use in the E. C. Lab.

[fol. 5266] It was decided to leave the 1000 ft spans of 397,500 [7-G-4a.1] cm with various grease protective coatings throughout the [16-199] coming winter to gather data concerning self-damping characteristics. After that the program will be discontinued.

There was considerable discussion concerning the best [7-G-4a.1] use to put our test data comparing the Alcoa armor rods with [16-159] preformed armor rods and reduction of vibration. It was pointed out that comparative test data with Alcoa products and preformed rods could not be published in such magazines as "Electrical World" but that this information had been effectively used for our sales forces in combatting preformed propaganda.

It was decided to change Job Order No. 16-108 to read [16-108] "Development of Dampers for Structural Members". The work would also be applicable for lamp standards. The meeting was recessed at 6.00 p.m.

The meeting was reopened at 8.15 a.m. September 12, with a discussion of the vibration problem, and it was de-

cided instead of using the expression "P/P max" to refer to this [7-G-4a.3, 16-97] as "damping efficiency". It was announced that Technical Paper #13, covering the vibration problem, is now in the hands of the printer after acceptance by the Alcoa Editorial Committee, as is also a short paper on the Application of Stockbridge Dampers, which was presented to the Poles, Towers and Conductor Subcommittee at the AIEE Summer Meeting at Montreal. Mr. Hartmann reported that the publications department wishes to combine these two Technical Papers, but that he advised them that this was inadvisable, as they were two [fol. 5267] separate publications and should not be combined or even put in similar bindings. Mr. Tompkins expressed the opinion that efforts should be made to get popular articles published in "Electrical World". It was reported that our negotiations with them in the past had been most unsatisfactory, as they wished to rewrite papers to [16-97] suit themselves, which is considered undesirable. It was pointed out that the early work that was done by Alcoa on vibration had not been exploited as much as it should. Mr. Hartmann advised that this is now under study. There was considerable discussion concerning the merits of tapered armor rods and preformed armor rods and straight rods. It was agreed that power input curves of straight armor rods over Drake conductor would be run in the indoor lab to supplement previous data on preformed rods and Alcoa tapered rods.

Mr. Rawlins reported that the analog computer work in connection with the design of new dampers has progressed very satisfactorily. There was considerable discussion concerning [16-97] the material used in damper cables and the advisability of using aluminized steel wire, or combination of steel wires and aluminum; it was pointed out that aluminized core wire is superior to galvanized core wire because of resistance to corrosion. [7-G-4a.3] It was decided that the main effort should be exerted along [16-237] the line of improved damper performance and some work should be done toward the investigation of the use of aluminized core wire for damper cables. It was decided to experiment with the 10 lb damper, using aluminized steel core wire.

Mr. Dallye reviewed the deterioration of dampers sup-

plied to a customer because of rusting of cadmium plated parts. [16-364] Mr. Englehart remarked that vinyl base [fol. 5268] paints were not satisfactory for the type of test being run in the high humidity [16-364] cabinet. Mr. Dallye advised that he would check with Mr. Ray at ARL to see if they could not secure an improved type paint.

Mr. Phillips reported that radio influence work at [7-G-5] Leadville, Colorado, is under way and that the last six months had been spent in instrument calibration, no actual tests have been run yet.

It was reported that the new type tubular compression [16-297] sleeves for large diameter ACSR eliminate the use of spheres at the end of this sleeve to prevent radio interference, which is considered a great improvement over the old cast connector.

It was reported that as the result of a great deal of work both analytical and experimental, it is now possible to [7-G-5] compute a-c resistance and reactance of any type stranding [16-276] of ACSR within 1% accuracy. It was reported that three companion AIEE Papers will be presented at the AIEE Winter Meeting [16-334, 16-318, 16-330] covering "Magnetic Effects of ACSR Core Wire", "Computation of a-c Resistance and Reactance of ACSR" and "Current-Carrying Capacity of ACSR". It was emphasized that it would be quite important to follow these AIEE Papers up with the Alcoa publications on "Electrical Characteristics of ACSR". It was pointed out that personal contact with the Editorial Committee is helpful in expediting the review of Technical Papers and arriving at a constructive solution to questionable points in Technical Papers to be released for publication.

There was discussion concerning the damping of long [7-G-4.a] river crossing spans at high tension on the West [fol. 5269] Coast. Recent tests at Massena with two dampers at the third points, and other tests with festoons were reported. It was decided as soon as complete test data are available on the model span at the indoor test span that the information be passed on to P. G. and E. It was reported that in efforts to damp small conductors Alcoa armor rods have proved to be a better damping device than any festoon tried so far. It was reported that we are in

the process of securing new type preformed festoon type dampers which we plan to test.

It was reported that artificial galloping has been excited [7-G-4a.3] at the outdoor test span, obtaining amplitudes of 3 to 4 [16-294] feet, using a torsional tuning bar on the span having neoprene air foils.

It was recommended that a short article reporting the [JO-16-318] solar absorption test be worked out for publicity along this [16-330] line.

The emissivity test work at Purdue is now progressing [7-G-5] and it is expected this work will be complete this year. [16-274]

It was recommended that the tensile tests on conductors [7-G-5] annealed to various degrees at Purdue University be run by the [16-160] P. T. Lab. as soon as practical and a final report on the work issued.

It was decided that PVC covered Triplex should be [7-G-5] tested in addition to the other samples on the 300 amperes [16-345] failure to destruction tests now in progress.

It was decided to give A-Plus priority to Job Order [7-G-6] 16-291 covering tensile creep tests, stranded aluminum conductor [16-291] at elevated temperatures.

Job Order 16-340 should be known as "Exposure Tests [fol. 5270] [7-G-6] of Conductor at Jenner Test Site, Pacific Gas and Electric [16-340] Company" instead of "Test Site Near Bodega Bay".

The question was raised as to the amount of good-[7-G-6] Alcoa would derive from Cold Room Icing Tests of Stranded [16-355] Conductor run at the Cleveland cold room. The consensus was that in addition to the customer good-will it would possibly lead to other advantages for Alcoa.

Mr. Dallye reported that samples of Unoba A2 and [7-H-2] Tabular Alumina Filler Compound was being used by some [16-344] customers and company plants. However, a better product is still being searched for. This has had a very good acceptance and is greatly superior to zinc chromate.

Mr. Dallye stressed that it is important to find a more [7-H-2] uniform and satisfactory method of scratch-brushing grooves [16-356, 16-359] in p. g. clamps. Con-

siderable numbers of clamps have been returned from our customers because of poor contact resistance. Mr. Guess stated that any specific recommendation for scratch-brushing for both hand and power type brushes should be available to pass on to customers when requested. Mr. Kessler agreed to work out recommendations on the proper brushes to use for both hand and power applications. This information would be reviewed with the E. C. Laboratory before it was forwarded to Mr. Guess. The relative merits of cleaning by scratch-brushing versus chemical cleaning of p. g. clamps was discussed. Mr. Kessler stated that it was purely an economic problem as to which process is best, as both methods can produce satisfactory results if properly used.

Mr. Kessler advised that 50% zinc and 50% tin solder [fol. 5271] is to be used in place of lead-tin solder in the production of copper bushed p. g. clamps. It was expected some savings will result.

It was agreed that on Job Order XE-249, Alcoa #2 [7-H-4, XE-249] Electrical Joint Compound Test should include a corrosion test to study the effect of Alcoa #2 Joint Compound on silver-plating. Mr. Cope agreed to look up the letter concerning this subject which gives the full requirements. Mr. Dallye reported that he had a test report made by Alcan on various joint compounds which he would have copied and sent to various interested parties. Mr. Dallye stressed the fact that we are still looking for a joint compound better than #2 Electrical Joint Compound. Mr. Dallye pointed out that in the wording of Item 7H5, the [7-H-5] word "Lubricant" should be changed to "Sealing and Filler Compounds for Conductor and Accessories". The word "Lubricant" is very misleading as it is not a lubricant that is needed.

Mr. Dallye stressed the need for short-circuit tests on parallel groove clamps. Also data are needed concerning the effect of conductor tension on bolt torque and contact pressure. The effect of different lubricants on bolt torque and pressure should be investigated more fully.

Mr. Engelhart raised the question as to the advisability of a research program on wiring harness under various conditions of corrosion. Such a program would take about five years. It was agreed by the committee that the Sales

Development Division would handle this when the need for such work arises. Mr. Engelhart also raised the question concerning underground corrosion of aluminum grids used in grounding systems. It was the consensus of the [fol. 5272] Subcommittee that it is not particularly interested in this project. This problem should also be reviewed by sales development and also any other interested parties. It was the consensus that work should be done on soil corrosion of insulated aluminum conductor for direct burial in the ground.

VII. Review of Investigations at Massena Works

Mr. Kessler called attention to his letter dated August 31, 1957. Mr. Kessler reported on the work to develop a high strength alloy for all-aluminum stranded conductor. A smooth body conductor constructed of five strands of 3004-H18 Wire with two EC-H19 strands could be produced at a cost of 15% to 20% above equivalent ACSR. Some experimenting had been done on 2 EC + .25% copper in a T81. The production trial is nearing completion. However, it is expected this will cost approximately 30% over ACSR. It was recalled that the goal for this type conductor would be perhaps 10% above ACSR in price, and have a conductivity of 56% with a tensile strength of 40,000 to 45,000 psi. Best results so far in conductivity are around 53%.

Recent advertisements by both Kaiser and Reynolds concerning high-strength all-aluminum conductor were discussed. Mr. Kessler emphasized that the Reynolds products using 5005 alloy cannot possibly result in a conductor anywhere near the equivalent strength of ACSR, size for size. It was agreed that a strong alloy conductor having the strength of about 10% less than equivalent size ACSR and about 15% maximum price increase over ACSR would have possibilities and that the efforts would be exerted to find such a product. The possibility of stranding combinations of 2 EC-T81 with EC-H19 will be investigated by Mr. Kessler and Mr. Coffin.

Smooth body Stranded Conductor was discussed at length. Mr. Guess pointed out that because of the current price war this product had not been pushed. It was emphasized that the increased cost of this product over stand-

ard conductor would eliminate it as it appeared that a premium price cannot be realized on this type conductor. It was the opinion that smooth body has a real field in covered conductor because of the consequent saving on covering material and also the saving of space. However, this depends on holding the cost down to that of standard stranded conductor. It was decided that Mr. Kessler and his group would study the problem further, and if such conductor can be made on a proper cost basis it will be introduced to the market at a proper time, when prices have become stabilized.

The Identification of Massena Stranded Conductor by means of Panniers 127-1/2 red marking ink was discussed. Mr. Turner pointed out that this ink will bleed through into any protective grease that may be applied to the conductor for protective purposes. Mr. Turner advised that Southern California Edison had requested that conductor manufactured for them be identified by an orange color paint, and after considerable investigation by paint manufacturers and ARL at New Kensington, a lead-free orange paint had been successfully applied and that this paint will not bleed through Calol White Grease No. 2 which is standard protective grease used by Southern California Edison Company. It was agreed by the Subcommittee that this entire subject should be reopened and that Mr. Turner should send samples of painted wire to Mr. Engelhart [fol. 5274] for examination and that the Product Identification Subcommittee should be informed of the findings.

It was reported by Mr. Kessler that recent attempts to improve the quality of ACSW had been unsuccessful and the question was raised if this problem should be further pursued, in that the Bell Telephone people no longer contemplate the use of ACSF for open wire telephone circuits, as they are now using an aerial type cable using aluminum communication wire insulated with Polyethylene in pairs carried by a steel messenger. Mr. Guess commented that the railroads and telegraph companies are still interested in the product. Mr. Coffin reported that he had received information from two different sources to the effect that Copper-Weld now has an aluminum-clad steel wire similar to Copper-Weld which they are just about ready to introduce to the market. Mr. Coffin pointed out

that it might be of considerable advantage to Alcoa to secure a patent license for the process Copper-Weld is using for the manufacture of this product. The possibility of an all-out program to develop the process at ARL New Kensington was discussed. It was estimated the first year's work would amount to \$25,000 and may continue through three years with no guarantee of success. In light of the possibility of Copper-Weld already having a process worked out it was agreed that no further work on this problem should be done at the present and that Mr. Coffin would initiate negotiations through suitable channels to explore possibilities of securing a license from Copper-Weld. Mr. Hartmann stated that he would advise, in light of the present situation, the Process Metallurgy Division not to put an item in their budget for Research on ACSW and that if the situation changed, it will be put in as a special item later. Mr. Kessler reported that Triplex with ACSW Neutral had very poor customer acceptance and had been used by one company outside of Alcoa, the Nantahala Power & Light Company. It was decided that no indoor test span space should be used for testing fatigue characteristics of ACSW but some should be installed at the outdoor test span for natural vibration tests.

Mr. Kessler reported that the production of the 62% minimum conductivity EC was moving along, but that there were considerable quantities of old stock. Mr. King reported that this project was also coming along well at Vancouver. It was pointed out that in light of this higher minimum conductivity conductor that the precision of conductivity measurements should be closely checked and that samples from Vancouver and Massena be sent to the E. C. Laboratory for additional checking on the Kelvin Precision Bridge. It was pointed out by Mr. Hartmann that the conductivity measurements had never been placed under the type of control that mechanical testing and chemical analysis had been, and perhaps in light of this new development the matter should be looked into to set up a regular program for conductivity tests and checking. Conductivity samples should also be sent to Mr. House for test from both Vancouver and Massena.

Mr. Turner reported that the Kaiser people on the west

coast were already aware of the fact that we had sold A.G. & E. some 62% minimum conductivity conductor. It was the recommendation of the committee that Mr. Coffin take steps to set up a meeting in Pittsburgh for interested [fol. 5276] parties to study the introduction of 62% minimum conductivity EC Wire to the market, which would include exploration of the possibility of placing a small premium price on 62% minimum conductivity wire of $\frac{1}{4}$ cent.

VIII. Miscellaneous Items

It was emphasized that the work of the Subcommittee on Electrical Conductors includes electrical conductors and accessories which should cover the full scope of conductors as well as overhead transmission circuits. One exception to this is the work on the foil coil project which is being followed by the Capacitor Foil Committee.

The Armour Research Foundation proposal that Alcoa sponsor a continuation of their research work on aluminum connectors was considered by the Subcommittee. This program was originally initiated by the Edison Electric Institute and upon completion the sum of \$70,000 will have been expended. EEI have decided to terminate the program when the present funds are exhausted. Accordingly, Armour approached Alcoa as an exclusive sponsor for the continuation of the program. The first year's work would entail an expense of \$30,000. After considerable discussion the Subcommittee recommended that the program should not be pursued by Alcoa and Mr. House was delegated to write Dr. Colnar of the Armour Research Foundation advising him of the Subcommittee's action.

Recrystallization temperature and creep rate of aluminum conductor was discussed. Mr. Bossert has already advised Armour that we would think about the project and [fol. 5277] that if we decided to go into it we would let them know so that so further reply to Armour is in order. After considerable discussion it was agreed not to go into this program, but to conduct a modest investigation of our own, which was reported to be already under way, using 12 ft lengths of wire which had been flexed and straightened. These will be checked for creep rate and the effects of flexing on the temperature of recrystallization.

Advertising programs on stranded conductors being car-

ried out by one of our competitors was discussed. It was pointed out that these advertisements do not include cost in their claims of efficiency of transmission and other advantages. However, it was agreed no counter-moves concerning these advertisements should be taken, and it was pointed out that misleading advertisements usually boomerang.

Mr. Cope advised the Subcommittee of a request made by the Square D Electric Company, through our Detroit Sales Office, to conduct test on aluminum fittings manufactured by their company. It was pointed out that similar requests of this nature had been turned down in the past, and that we should not become involved in commercial testing. It was decided by the Subcommittee that Mr. Cope should advise Mr. Wooldridge of our Detroit office that we are not in a position to undertake these tests for Square D.

The manufacture of a special type ACSR which is hoped to have self-damping characteristics was discussed. Confidential negotiations have been carried on with Okonite and they have agreed to make covered strands which would be part of the 795 MCM ACSR 26/7. The Subcommittee agreed that this project should be pursued in an effort to develop this new type conductor.

[fol. 5278] An experimental type damper designed by Mr. W. E. Michalke was discussed and it was decided to advise Mr. Michalke that based on information already available it appeared doubtful that this type damper would be effective.

Investigation covering welding of electrical conductors was discussed. It was reported that present specifications are the same as those used for welded pressure vessels and are quite unrealistic for welding electrical conductors. Mr. Cope agreed to get a group together to discuss this which would include Mr. Guess, Mr. Sandell and Mr. Wagner, to see if a satisfactory specification for welding electrical conductors could be drawn up. Mr. Hoglund and Mr. Rogerson would also be included in the group. Mr. Kessler suggested that the results of this committee be submitted to the ASTM committee B2. It could be made a part of the section known as "Specifications for Aluminum Bus" Committee B2 ASTM. Mr. Grier emphasized the

need for an acceptable specification for welded bus which could be used by consulting engineers. The only code available now is the ASME test code for pressure vessels, which is entirely too severe for this application of welding.

The question of getting out a report on Chemical Cleaning for Weathered ACSR was brought up. It was stated that so far a satisfactory method of chemical cleaning had not been arrived at, although one was still desirable. Mr. Coffin expressed the opinion that he did not think it advisable to circulate information on the method developed because of the fume and safety angle and also the fact that [fol. 5279] it did not do a very good job on the inner layers of the conductor. Apparently at this time scratch-brushing is still the best method of cleaning.

The question was raised concerning publicity on the tests of the DuPont explosive type joint. It was stated that DuPont is not interested in publicity on this process at this time and Mr. Coffin expressed the opinion that he thought any publicity should be up to DuPont if and when they are ready.

IX. New Projects

Under new projects Mr. Guess stated that information concerning the relative effect of creep on Polyethylene, Neoprene and PVC covering for aluminum conductors would be helpful. It is pretty well established that PVC is quite susceptible and appreciably deteriorates on conductor strung under tension. Many customers have found this out for themselves and consequently refused to use either Neoprene or PVC covered Triplex claiming that the neutral would cut into the covering, causing failure. Various possible tests of this type were discussed. Mr. Hartmann suggested that Mr. Guess draw up a brief outline of what information he required as a sales aid so that a possible test program could be arranged.

Mr. House reported that Mr. Rawlins had been invited to give a talk on conductor vibration before the Alabama Section of the AIEE next March and that he expected to give the same talk before the New York section of the AIEE this coming December. Clearance to give these talks has been obtained from the Editorial Committee.

The possibility of Technical Papers on the Sleet Melt-

[fol. 5280] ing Tests carried out at Massena was discussed and it was agreed that such paper should be prepared as soon as possible for presentation to the AIEE. It was agreed also that a paper on the Conductor Icing Tests at Cleveland should be prepared as soon as practicable.

X. Budget

Mr. Hartmann presented a sheet showing the consolidated Budget items for all research on electrical conductors. This covered work by the Physical Testing Division, the Lubricants Division, the Chemical Metallurgy Division and the Electrical Engineering Division at Massena. Engineering Design Division should also be included. The budget was discussed at length; Mr. Dallye pointed out that there is still work in accessories that he would like to have done, namely, the short circuit tests on parallel groove clamps, tests on 356 alloy scratch-brushed and unscratch-brushed should be done. Mr. Kessler made the remark that he did not believe consistent results could be obtained on F castings without scratch-brushing. Mr. Hartmann asked for an expression from the Subcommittee if they considered that the budget was satisfactory for 1958 operation. Mr. Grier made the motion that the budget be accepted in its entirety and this was seconded by Mr. Coffin and unanimously carried by the Subcommittee. Mr. Hartmann stressed the point that it was the purpose of the research program to work on the problems which would bring Alcoa the most return and prestige, and that any suggestions from the members of the Subcommittee would be most welcome. Mr. Coffin stated that one particular project in which he was interested in getting on a commercial basis was the use of M475 alloy conductor.

[fol. 5281] Mr. Coffin referred to contacts that he has in the Hawaiian Islands. It was agreed he would investigate the possibility of erecting some M475 stranded conductor in the Hawaiian Islands, where the corrosive conditions are among the worst in the world.

HEH:ip

Hazen E. House.

[fol. 5282] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 150

Internal Correspondence

October 11, 1957.

From: C. A. Appel
Portland Office

To: Mr. E. P. Burton
Portland Office

Re: Electrical Conductor—Covered

We have for some time been in a negative sales position with respect to covered and insulated electrical conductors. Relying on others for mfg. of material and latterly putting in limited facilities of our own, we have yet to convince the customers Alcoa is firmly in the business and will make technical contributions to the industry. Kaiser's purchase of U. S. Rubber's Wire and Cable division only accentuates our position and will in the future, I believe, place us in severe jeopardy of a proper share of the aluminum cable market.

The announced plans to rectify this condition consist of a three stage growth in Alcoa facilities, beginning with a polyethylene line at Massena, a neoprene line at Massena and another polyethylene line at a location to be determined. Barring an acquisition of another company's facilities, there is reason to believe the plan should now be altered to include a polyethylene line at the Vancouver plant as the next step. I believe we should support this view and suggest we work closely with the Vancouver plant on the problem.

Last spring a study was made of the economics of Massena shipments v.s. Vancouver shipments of poly-thylene covered conductors to the territories of Seattle, Spokane, Portland, San Francisco, Los Angeles, Kansas City, Denver, Omaha, Wichita offices, as well as the El Paso area. Using 1956 booking figures and the freight savings on pig and ingot shipments east and finished product west, the net savings to the company of a Vancouver installation

[fol. 5283] were approx. \$7,000/year. This, however, did not amount to 20% on an investment of \$130,000. It appeared an additional 160,000 lbs. of West Coast aluminum weight business on top of the 400,000 lb. total would be required to reach this goal.

A recent cursory review of 1957 business seems to indicate a more favorable position to the proposition. Massena is running a full three-shift operation of which one shift is for West Coast destination. Since accommodation of further increases in polyethylene business will require additional facilities, West Coast bookings and shipments are up 50% in spite of a San Francisco decrease, and the change in the Los Angeles area to polyethylene has yet to take place, it would seem logical we should support a West Coast facility before further development at Massena.

Certainly we have a stake in a Vancouver operation. Even though Seattle district shipments of covered wire reflect the majority of the West Coast increase in business, a mill here would definitely generate further income for us. COPCO, now no factor in our covered business, would support the mill and I am sure P.G.E. and PP&L would of necessity enlarge on our share of their market.

I feel it will be to our own best interest to promote and aid Vancouver in the B for A currently being prepared.

C. A. Appel.

CAA:mrk

cc: Mr. H. A. Faisst, Seattle, Mr. W. A. Carleton, Seattle.

[fol. 5284] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 151

November 22, 1957.

Earl B. Cox, Cincinnati Sales.

Mr. P. T. Coffin, Pittsburgh Office.

Re: Electrical Conductor Sales Meeting, December 9, 10,
11, 1957

Our main interest is the competitive price situation in bare and covered conductors. Things are temporarily quiet but none of us are naive enough to believe the trouble is over. We have gone through the worst price war we have ever experienced. Did the percentages of the market obtained by Alcoa and our competitors change, or did our relative positions stay the same? Have our competitors been convinced that we all can get full-profit price and still obtain the same percentage of business? We hope it is not necessary to repeat this costly solution.

We seem to detect the feeling that most of our Utility customers would pay full price if the major conductor suppliers would hold firm. This probably is wishful thinking on our part, but we are wondering if other districts detect any of this feeling. We have noticed an encouraging sign. Southern Electrical Corporation seems to be holding to the price schedule since Olin-Mathieson bought them.

You know the situation that developed at General Electric, D.A.D., Cincinnati. We started at a price of \$.84/lb on flattened wire bus conductor cut to ten foot lengths. After numerous discussions about price with the customer, they decided to get competitive prices. This resulted in Alcoa having to cut the price to \$.45/lb to keep the business. It was difficult to convince General Electric that we were not gouging them at the start. I believe we [fol. 5285] should review our costs and selling prices on our products so we do not appear excessive when compared to our competitors.

What is the competitive picture on extruded bus conductor? General Electric now has a lower price on extruded bus from an independent extruder. We are trying to con-

vince them our quality control on such things as electrical conductivity and tensile properties makes our product worth more. The customer, however, is extremely price conscious.

What is Alcoa doing to expand its activities in the Electrical Conductor Industry? Are we going into the insulated wire, building wire, and other conductor applications? It seems that Alcoa cannot continue as leader in aluminum conductor if we do not produce some of those other conductors. It is disturbing to see Kaiser expand into all conductor applications and threaten to take over first place.

We have one customer showing interest in Reynolds Metals Company's new alloy 5005 conductor. I assume Rodee will have the complete story on that for the meeting. We would like to have samples available to give to customers to keep Reynolds out.

We suggest Dixon Lewis cover the up-to-date Conduit situation. The fact that we are now competitive with steel conduit on an installed basis should result in increased good business.

I am sure we will hear from the Development Division. I would like to have the latest information on silver plating aluminum. I notice Reynolds Metals Company is making some claims.

Earl B. Cox.

EBC:le

cc: Mr. L. H. Gray, Mr. George A. Bibens—Cincinnati.

"[fol. 5286]. IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 153

August 21, 1956.

T. L. Gilbert,
Covered Conductor Department,
Massena Works.

Mr. P. T. Coffin,
Pittsburgh Office.

T. L. Gilbert Suggest You Send a Copy to Kent Van Horn
& T. W. Bossert, N. B. Lane

Dave 8/27/58.

Re: Facilities for Neoprene and Rubber

Please accept my apologies for breaking into your meeting on Friday. Had I known ahead of time that my vacation schedule would permit me to stop off in the Alcoa Building, I could have made arrangements ahead of time to see you and L. T. We are naturally very much interested in your reactions to my letter of August 8, and I am glad you questioned my opinion that we do not need a high-priced rubber chemist to produce neoprene and rubber products.

This statement reflects our immediate thinking on producing the standard neoprene line wire and triplex items that we now obtain from Rome Cable, as well as the two-shot rubber-neoprene triplex. I see no reason why we cannot handle the technical problems of these products.

As far as the broad problem of development of new products is concerned, we certainly agree that an experienced technical person is called for. Without such a person, we would, as you intimated, just be following behind our competitors. We all agree that Alcoa would not want to be in such a position.

However, we believe that such a person, with the department and facilities that must ultimately come, should be a part of Alcoa Research Laboratories and not a member of our fabricating organization at Massena. If we hope

to compete development-wise with Rome Cable and the like, we will no doubt need research and development facilities approaching those that we have seen at Rome.

[fol. 5287] To sum up our position, we can undertake the manufacture of our present standard neoprene product without the benefit of an experienced technical man. To go further into the development of new products would require, as you stated, a technical body of appropriate background, size and facilities.

T. L. Gilbert.

TLG:jom

CC: Messrs. J. L. Patterson, Pittsburgh, J. A. MacLeod, Pittsburgh, N. B. Lane, Massena, C. L. Kessler, Massena.

(File)

Copied 8/27/58

TLG:jom

CC: Mr. K. VanHorn—ARL—New Kensington, Mr. T. W. Bassert—Pittsburgh.

[fol. 5288] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 154

Confidential

Minutes of Fall Meeting

Subcommittee on Electrical Conductors Massena, New York, September 10-11, 1958

The following detailed reports were submitted by members of the committee prior to the meeting.

Conductor Accessories—F. R. Dallye, Sept. 3, 1958.

Electrical Windings—R. R. Cope and S. R. Chapman, July 10, August 20, 1958.

Development and New Applications—S. R. Chapman, Sept. 9, 1958.

Massena Production Data—C. L. Kessler, August 25, 1958.

Massena Fabricating Works Development—C. L. Kessler, August 26, 1958.

Alcoa Research Laboratories—Progress Report—E. C. Hartmann, Sept. 4, 1958.

The minutes do not include the detailed information given in the above reports. Only matters discussed during the meeting are included herein.

Members Present

Mr. E. C. Hartmann, Chairman, Mr. S. R. Chapman, Mr. P. T. Coffin, Mr. F. R. Dallye, Mr. L. T. Guess, Mr. H. E. House, Mr. W. E. King, Mr. C. L. Kessler, Mr. N. B. Lane, Mr. J. S. Tompkins, Mr. R. N. Wagner.

Guests

Mr. L. M. Arbegast, Mr. E. T. Englehart, Mr. L. C. Get-singer, Mr. T. L. Gilbert, Mr. R. W. Knapp, Mr. E. K. Lanctot, Mr. C. B. Rawlins, Mr. T. E. Simpkins, Mr. W. D. Stewart, Mr. C. B. Travis, Mr. O. F. Turner, Mr. P. D. Tuttle, Mr. Y. C. Yedlicka.

[fol. 5289] Mr. Hartman called the meeting to order at 10:30 A.M. on September 10. All members were present. Mr. Hartmann welcomed two new members, Mr. Wagner and Mr. Chapman, also Mr. Otto Turner who was representing Vancouver. It was the wish of the Vancouver management that they be represented informally on the committee, without any regular membership.

I. Market Conditions and the Competitive Situation

Mr. Coffin reported that market conditions at present show a very mixed trend. Apparently little business has been placed with our competitors since June 13, when Alcoa went back on price schedule in an effort to end the price war. Most competitors, except two or three small ones, have held to this price schedule. Mr. Coffin reported most of the conductor business had gone to Alcoa, which would be good if it weren't for the fact that to keep their mills going, competitors may cut prices. There are several million pounds on our books and it is hoped that most of this

can be shipped before any further price cutting. Mr. Coffin expressed pleasure with the prestige and good salesmanship of Alcoa. Price cutting in the past has resulted in a general depression of prices as it has been Alcoa's practice to meet these prices, consequently it does not result in any increased business for competitors, but just make profits poorer for all. The present outlook is that the 1959 business level in conductor will be as good as 1958.

Mr. Lane asked if we were bothered by foreign manufacturers in our domestic market. Mr. Coffin replied that because of the tariff barrier this was not a problem. However, it is practically impossible for us to get any foreign business because of their low price schedules. Government subsidies in Sweden enable them to cut prices drastically. [fol. 5290] Combined shipments from Vancouver and Massena during July were the heaviest in 4 years. August and September also look good. The Covered Conductor Department at Massena had the best month in August that they have had since they began production. In spite of vicious price cutting, Massena has been able to show a profit on covered conductor. A profit has also been shown in expanded conductors. Mr. Coffin reported on the tie-line between Commonwealth Edison of Chicago and Indiana Michigan, a subsidiary of American Electric Power Corp.

Mr. Coffin reported that Kaiser is having almost identical trouble with popped strands that Alcoa had with Bonneville. Considerable mileage of Kaiser conductor will have to be replaced. As pointed out, most of Alcoa's trouble with Bonneville was caused by the contractor, whereas the contractors on the Chicago-A.E.P. Corp. tie line were two of the most experienced in the U.S. It is understood that 200 miles of 159 MCM ground wire will have to be replaced by Kaiser because of aluminum strand failures caused by very short length of lay of steel core. Because of these troubles Kaiser is presently somewhat fed up on the conductor business.

Mr. Coffin reported that after years of negotiating and studying, a transmission line with all-aluminum towers is about to become a reality. Negotiations are underway with Public Service Electric and Gas of N.J. The only other line with all-aluminum structures known at this time is the Kitimat line in British Columbia.

Mr. Lane said that he wished to go on record that Massena be given a chance to figure on furnishing the transmission tower structural shapes. He believed Massena can compete price-wise, both for company-use shapes and [fol. 5291] customer-use shapes. In all probability the shapes could be cut to size and punched at Massena, and delivered to the job-site at a price as low as extrusions. Mr. Lane reported that Massena definitely needed the structural business, as they were down to 2 to 4 shifts on the 26" mill, whereas some of the extrusion plants were on 20 shifts.

Mr. Coffin pointed out that Commonwealth Edison of Chicago and Philadelphia Electric Company are interested in aluminum structures. Sales Development has shown that aluminum towers weighing about 40% of steel are adequate and can be profitably sold at 50¢/lb. Galvanized steel towers require painting after 1 year in heavy industrial areas such as New Jersey, and after, at most, 3 years in other locations. Painting costs vary from \$600 to \$1200 per tower, and of course it is necessary to deenergize the line.

Mr. Coffin reported that the Copperweld Steel Co. had made contracts with Alcoa and Anaconda to join Copperweld as the sole outlets of Alumoweld wire. Mr. Coffin believes that the biggest outlet for Alumoweld wire will be the neutral for triplex. Alcoa has an exclusive contract to supply the aluminum powder for making Alumoweld. It was reported that interest in the Alumoweld product had been shown by Aluminum Development Assoc. in London. Their request for test data and samples will be forwarded to Mr. Coffin.

Mr. Hartmann called attention to Mr. Dallye's letter of Sept. 3, commenting on accessories for aluminum conductors. Mr. Dallye elaborated on the EEI standardization work on compression fittings. A number of manufacturers have complained about the cost of this test program. The initial stage will be on 4 sizes which will involve about 760 tests of various combinations of 6 manufacturers' fittings used with each other manufacturers' [fol. 5292] tools, etc. The main question is finding a suitable laboratory for doing this work. Mr. Dallye has contacted the Detroit Edison Co., who have equipment and

manpower for the work. There is also the possibility that some of this work could be done at our Vancouver Works, as Mr. Turner advised that their testing machine is not very busy. It was agreed that Mr. Turner would look into the probable costs of running these tests at Vancouver, on the basis of making a modest profit. There are no known commercial laboratories who have the proper type horizontal testing machines to make such tests.

II. Development Trends and New Applications

Mr. Cope called attention to 2 reports prepared for the Electrical Winding Subcommittee, dated July 10 and August 20. An illustrated talk has been presented to educate our own sales people and our customers on the advantages of strip foil windings. Coil designs from about 30 different customers have been received. To date coils for about 6 different customers have been prepared. No. 3 EC having 61.0% minimum conductivity has been designated as the alloy for strip windings.

Mr. Cope reported that Alcoa is now in the magnet wire business. Rea Magnet Wire in Fort Wayne, Indiana, who are the leading independent producers of magnet wire, will make 10 to 24 gage magnet wire for Alcoa which will be insulated for high temperature operation. This will be manufactured by Rea as an Alcoa product, and will be marketed by Rea as Alcoa agents. The price will be about 6 to 14% lower than copper 2 sizes smaller. Mr. Coffin said that Rea's sales force is well known in the magnet wire industry and that they are best suited to sell this product. Perhaps later on they might buy red draw wire rod instead [fol. 5293] of the small wire. In applications where space factor is not of much importance, as in small appliance motors, there may be a good market for aluminum magnet wire.

Mr. Chapman reported a great need for a report on silver-plating for distribution to our sales forces. Present information on silver-plating techniques and thicknesses required are conflicting. Mr. Chapman asked for an expression of policy on silver-plating. Mr. Coffin reported that he had prepared an initial Memorandum on June 6 on this perplexing problem. It was pointed out that G.E. does not use a copper flash and have gotten into no trouble,

whereas our findings show that the copper flash is beneficial. It is appreciated that the commercial angle, the scientific angle and the customer-relation angles are all very important in any Alcoa release. It was agreed that Mr. Coffin would revise his Memorandum in an effort to produce instructions to our sales forces that will give harmonious results.

Mr. Chapman brought up a recent letter in which he indicated the need for Underwriters' approval on unplated aluminum bus. Mr. Wagner reported that Alcoa had sent out a specification some time ago that all our purchases would be unplated aluminum bus. The former specification said that we would accept silver-plated aluminum but would prefer bare. It was decided that the Underwriters' Lab should not be contacted on this subject, and that a requested article for Plating Magazine should not be written at this time, because of a number of unanswered questions.

Mr. Chapman reported that it has been established that copper-plated aluminum wire cannot compete with tin-plated copper unless it can be drawn down after plating. [fol. 5294] Mr. Hartmann reminded the group of the R-168 Process developed some years ago at ARL for solder-covered wire. Further work could be done on this process if justified. Mr. Chapman expressed the opinion that the present low price of copper would not hold up very long and any substantial price increase in copper would make solder-covered aluminum wire competitive. The process used by the Steel Protection and Chemical Co. at present gives only a mechanical bond and will not stand drawing into small wire. Mr. Coffin spoke of the need for higher speed methods of applying the solder coating to aluminum. Mr. King reported on a new type process where the wires form a helix and a mile of wire fits in a 60-ft tank. This process is being further investigated.

Mr. Chapman reported there is considerable interest in copper-plated aluminum for electronic applications. Mr. Chapman exhibited 2 samples of copper-clad aluminum, similar to Alcuplate, made at ARL. It was pointed out that this product has many electrical uses and should be followed up. Mr. King pointed out that one danger of rolling copper-clad aluminum in aluminum rolling mills was copper contamination of other aluminum products.

Aircraft and Marine Products is offering a line of compression connectors for both transmission work and distribution, which will be in direct competition with Alcoa.

III. Production Situation

Mr. Kessler referred to his letter to Mr. E. C. Hartmann of August 25, 1958, reviewing the production situation at Massena Works. Mr. Kessler pointed out that money could be saved if grease was applied only to the outer strands of 19-strand steel core. Mr. Coffin pointed out [Vol. 5295] that about 40 cents a pound is being realized for 22-cents-per-pound grease. Furthermore we must usually apply grease to all layers or not get the order. There was considerable discussion on methods of applying grease to 7 and 19 strand core wires and it was finally decided that this would be discussed between Mr. Kessler and Mr. Turner.

After considerable discussion Mr. Kessler agreed that they would study the advisability of requesting revision of ASTM Specification B-230 for hard drawn aluminum wire for electrical purposes. The proposed method would tighten the specifications and reduce the amount of testing necessary.

The advisability of being able to apply Neoprene insulation to conductors was discussed. Mr. Kessler advised that an investment of approximately \$437,000 is required with a period of about 2½ years necessary to return the investment. This proposal had been submitted to Mr. Coffin for study. Mr. Gilbert reported that the Covered Conductor Mill was running 3 shifts now. Consideration is being given to trading in the extruder purchased 2 years ago for a new one which would give 60% more capacity.

Mr. Guess raised the question if we would be interested in taking the order for control cable which could be color coded. Mr. Gilbert advised that we are in the initial stages of placing an order for a buncher and saw no reason why such control cable could not be fabricated. Mr. Guess said Mr. Gunther is very anxious to have a trial run made of control cable. Mr. Guess pointed out the desirability of having test facilities to meet the required specifications. Mr. Kessler was asked to look into the question of con-

ducting adequate tests and will get in touch with Mr. Guess to work out an adequate program.

[fol. 5296] Mr. Kessler pointed out that costs of conductor accessories are being reduced. There was considerable discussion concerning fluctuation of production costs and it was pointed out that there are many variables that affect these figures.

Mr. Lane raised the question if Alcoa had considered the purchase of Belgian core wire which sells for a considerably lower price than domestic products. Mr. Coffin explained this was now in the hands of top management.

Mr. Turner reported that the reason he was requiring additional 84" steel reels from Massena was reels were not being returned but were being held up because of customer right-of-way difficulties and other things beyond his control. There are still 1550 84" steel reels at Massena Works on July 31.

Mr. Coffin reported that the new committee for Wire, Rod and Bar Association had been formed, for which he was appointed temporary chairman, and one of their most important goals is to try to standardize reels. Most of our competitors are represented on this committee and it is hoped that within a year manufacturers will be able to achieve standardization which would, of course, be a saving to both customer and manufacturer. Mr. Lane asked if some of our reels would have to be scrapped. Mr. Coffin said no. Mr. Coffin advised that the eventual goal of this committee would be 2 types of reels, an aluminum reel and a nonreturnable wooden reel. Mr. Turner asked what effect it would have if the customers requested longer lengths of cable. Mr. Coffin replied that Mr. Rodee was working on this problem.

IV. Electrical Uses of Aluminum in Plants

Mr. Wagner reported that the new pot rooms at Massena [fol. 5297] and Warrick had more aluminum than any other potrooms built by Alcoa. The construction program of course has been very much curtailed during the past year, so that not much new equipment is being bought. They are now specifying that switchgear bus not be silverplated. The use of tubular bus instead of flat bus is being investigated. Mr. Wagner said they were interested in the

buncher for Massena, so that our requirements for control cable can be purchased within Alcoa.

Mr. Wagner reported interest in Cadweld. The question of the use of insulated aluminum conduit for use underground and in highly corrosive chemical plants was discussed and the economy of its use was questioned, although all agreed that the problem should not be dropped. It was agreed that the covering of any conduit should not be undertaken in Massena at present. Mr. Guess reported that some of the newer plastic type conduits are very strong structurally and would be more economical than insulated aluminum conduit. Mr. Guess asked if we could make polyethylene pipe at Massena to cover orders from duPont. It was pointed out that it would not be profitable to tie up the extruder line in Massena and that this pipe would be best farmed out to makers of plastic pipe. Mr. Gilbert pointed out that the competitive situation was quite strong, so that chances of getting a good price are excellent.

V. Electrical Uses of Aluminum by the Power Division

Mr. Tompkins reported that all the silver plating on the apparatus contacts at Warrick is being removed where connection is being made to unplated aluminum conductors. He reported there has been considerable interest by visitors [fol. 5298] to the Warrick Power Plant on the wide use of architectural and structural aluminum. Serious consideration is being given to the use of aluminum towers at the Suriname Power Project. There is also a great deal of aluminum being used in the new St. Lawrence switchyard. Mr. Coffin advised that an attractive brochure of the Warwick Power Plant, telling of all the uses of aluminum, will be released in a few weeks.

VI. Review of Investigations at Massena Works

Mr. Kessler reported requests for 50,000 ft of 5005 No. 4 Conductor. Apparently it can be sold at the same price as equivalent size ACSR. Mr. Tompkins asked about the amount of alloy conductor being sold for overhead transmission lines. Mr. Coffin reported there has been very little 5005 alloy sold and he had been informed that less than a million pounds of Kaiser AAAC were sold since they first

introduced it. He expressed the opinion that when Alumoweld wire is fully developed, we will have a strong conductor far superior to 5005 or AAAC. Mr. Coffin pointed out that tests run in the past on all-aluminum alloy, all-aluminum, copper or any other type non-reinforced conductor show it will not take abuse of overloads or excessive currents as well as ACSR, a very important point with all utility customers. Alumoweld should perform more like ACSR in this respect.

Mr. Kessler pointed out there is some confusion in aluminum clad steel wire. It was pointed out Public Service of Colorado buy No. 4 ACSR .203 by .0916 in. whereas the combination is .236 by .016 in. aluminum over steel for all other customers. It was pointed out that the No. 4 wire furnished to Public Service of Colorado was really No. 5, but they refused to accept this designation. Mr. Kessler cautioned that sooner or later this situation will cause [fol. 5299] trouble. Mr. Guess will make efforts to get this ambiguity cleared up. Delays in recent ACSW orders have been caused by delay in receiving stock from New Kensington. The question of what the actual cost of ACSW is, and whether a profit is being made will be investigated.

There was considerable discussion of the merits of Alumoweld both for use as conductor and core wire, and Mr. Coffin expressed high hopes for this product. Mr. King thought there was a good possibility of raising the conductivity of Alumoweld by better control of the impurities in the aluminum powder.

Mr. Kessler reported that we have one customer, Louisiana Power and Light, using a great deal of 7-strand all-aluminum smooth body conductor in the form of polyethylene covered service drop, purchased through our Graybar distributor. 418,000 ft had been purchased since the first of the year. Mr. Kessler is investigating disposing of 23,000 ft of surplus inventory of No. 2 Smooth Body Conductor.

Mr. Kessler reported that unfortunately we have been unable to obtain any information from G.E. on bunched conductor made at their Asheboro, N.C. plant. This conductor was to be used for electric blanket control wire. However, due to the lower price of copper G.E. seems uninterested in this project at this time. Mr. Cope suggested

that after we get the buncher we can go back through American Insulated Wire and get some results. Mr. Kessler agreed and commented it would be easier to work with AIW as they were closer to Massena and had indicated more interest in the problem. However, he warned that aluminum lamp cords were going to appear rather bulky because of the difference of conductivity compared with [fol. 5300] copper. In the past AIW did not want to release a buncher for experimental work thus reducing their overall plant profits.

Mr. Kessler reported his recent difficulties in obtaining 62.0% minimum conductivity and that studies were being made for better control. It was pointed out that the ore being received by Vancouver is much better grade from an electrical conductivity point of view than that received at Massena, which is higher in silicon. Mr. Kessler anticipates further trouble until the new potrooms are well broken in but that this will be watched with diligence. Mr. King questioned that serious troubles were being experienced. Mr. Kessler reported that although we are having periodical difficulties we are riding along on the narrow edge. However, all EC conductor meets the 62.0% minimum conductivity.

There was considerable discussion concerning the application of 10/64 in. thick covering on conductor. It was pointed out that there is a sizeable amount of business in this product, but at present Massena has no facilities for testing the finished product. Additional electrical testing apparatus costing between \$25,000 and \$30,000 would be required. Mr. Coffin suggested that Rome Wire and Cable be contacted to determine at what price they would make these tests for us in case we get an order. Mr. Gilbert agreed to check.

The subject of identification of Massena Stranded Conductor was discussed at length. Identification by mechanical indentation or by ink or paint were discussed. Prices quoted on mechanical devices in the past were considered excessive. Apparently the method used by Vancouver to identify conductor furnished the Southern California Edison Co. using orange paint has been satisfactory and the [fol. 5301] cost has been nominal. Mr. Coffin's objection is that there is no certainty the paint will last 20 to 30

years. Mr. Coffin insisted that it is very important to find a practical way to identify Alcoa Conductor. Mr. Guess pointed out that this problem had been on the agenda for years. Mr. King described a method where certain impurities are cast in the ingot and the product can be identified metallagraphically, but convincing the customer might be difficult. Mr. Lane asked for an investigation through sales research and operations to study the problem of identification, and to come back to the next E.C. Subcommittee meeting with an answer. It was pointed out that a Task Force had been in existence and that many suggestions were on record but all appeared too costly or were otherwise unacceptable. Mr. Englehart reported that the tests on paints submitted by Vancouver had not been going long enough to come to any conclusions. Mr. Turner said they buy their paint from Walker Paint Co., Salem, Oregon. Mr. Hartmann pointed out that lamp black would be satisfactory for changing the color of the orange paint used at Vancouver. An Alcoa blue color would be more desirable but additional tests would be required. Mr. Kessler moved that the committee suggest to Massena and Vancouver that all stranded conductor be identified by the orange paint similar to that used by the Southern California Edison Co. if Southern Cal has no objection to such use. Mr. Coffin seconded and the motion carried. Mr. Guess was asked to secure the Identification Committee's O.K. for this procedure. It was pointed out the original purpose of the orange paint was to identify conductor stolen from Southern California Edison property. However, in case they object to our use of the orange color, lamp black or yellow paint can be used with reasonable chances of success. Mr. [fol. 5302] Dallye reported a recent case indicating the importance of proper identification of Alcoa products. Kansas City Power and Light had some copper bushings made by an outside contractor and installed in Alcoa clamps. Without the Alcoa marking numbers indicating that the clamps were originally unbushed, this would indeed have been very puzzling, but because of our marking was easily solved.

Mr. Kessler reported on the covering of No. 8, 10, 12, and 14 AWG solid and stranded insulated control conductor for Alcoa requirements. Mr. Wagner recalled numerous

complaints from plant people on certain conductors supplied by Massena. Mr. Guess pointed out that this difficulty had been cleared up and that Mr. Gunther was preparing specifications for Massena to work from.

Mr. Kessler reported that stranded conductor with steel core made of Alumoweld for 1/0 ACSR 6/1 and 636 MCM ACSR 24/7 is planned. Fabrication of these conductors is being delayed by the heavy mill schedules, around 5,000,000 lb a month. It was agreed that the manufacture of these conductors would be worked into the schedule as a research project.

VII. Review of Investigations at Alcoa Research Laboratories

7-C-12 & 7-E-5. Mr. Hartmann made reference to the Sept. 4 progress report of ARL covering work of all divisions on electrical conductor and proceeded to report on the first several items covering static properties of No. 2 EC in various tempers, effects of temperature, creep and fatigue, flexural creep of No. 2 EC and properties of No. 2 EC-T84. This work is nearing completion and formal reports will be issued as soon as possible.

[fol. 5303] 7-E-7. Mr. House reported that heat cycle tests on "pigtail-type" connectors (JO 16-357) run for Mr. Gunther to evaluate connectors to be used in Alcoa plants was complete and the information passed on to interested parties. Final report is being prepared.

7-E-8. Mr. Tompkins asked about the status of the work on bus conductor in stacks (JO 16-149). Mr. House replied that Mr. Bond would resume work on the report as soon as possible. This work had been delayed by the investigation of bolted lap joints in bus conductor and the unforeseen difficulties arising from the use of unplated against silver-plated conductor. Mr. Keller is continuing the study of this problem. Recent heat cycle tests of thick silver plated bus against thin plated bus indicate that no trouble is to be expected from this type joint.

A rather intensive test, JO 16-351, has been under way for some time in an effort to find a more satisfactory aluminum-to-copper connection for use in Alcoa potrooms. Aluminum-to-copper joints abraded through No. 2 EJC

increased approximately 30% in resistance while aluminum-to-aluminum and copper-to-copper control groups were stable. Mr. Tompkins raised the question of whether joining aluminum to copper was a serious question outside of the potrooms, and Mr. Wagner questioned the seriousness of this problem even in the potrooms. However, it was reported that at the Massena Works the aluminum-to-aluminum joints will last the lifetime of the pot, which is about 3 years, whereas the aluminum-to-copper joints must be remade once a year. Mr. Wagner said he doubted if this was done, certainly not on a company-wide basis. Mr. Guess recalled that the Alcoa Tennessee Smelting Operations had reported essentially the same results as [fol: 5304] Massena on copper-to-aluminum joints. Mr. Tompkins and Mr. Wagner agreed that the deterioration which takes place in aluminum-to-copper joints should be further investigated but they believe it is not a serious problem in the plants, certainly not as serious as aluminum-to-silver joints. Mr. Tompkins does not like the use of Alcuplate. It was pointed out that one of the old St. Lawrence potlines which will be restarted in the future will have Alcuplate wafers in aluminum-to-copper joints.

It was decided to drop JO 16-369 covering Handy and Harman Silver Particles Products for Joint Compounds because of unsatisfactory results both here and at G.E. Under JO 16-408 Mr. Dallye asked if the work Dr. Lewis was doing on X & R of Bus Conductors would be similar to that by Prof. Higgins. Mr. House reported that this would be an entirely different approach in which the 650 IBM machine would be used in conjunction with help from Dr. Whidden's group to provide tables for the Alcoa Bus Conductor Handbook. The cost will be less than \$2,000/year.

It was explained that JO 16-416, "Contact Resistance Measurements of Experimental Joint Compound in Stacks of Bus Conductor", was being carried on because of sales resistance to No. 2 EJC. Mr. Tompkins asked if much of this work had not been done before, but it was explained that a thorough review, taking into account the older work, seemed to be justified in the light of recent developments. No. 2 EJC is meeting sales resistance because of the safety warning on the can and for other reasons. Mr. Hartmann

advised that Mr. Keller also has money in its budget for studying joint compounds. One problem is the part played by zinc particles in Penetrox. Mr. House explained that a technical paper is now in preparation that will present [fol. 5305] the long successful history of No. 2 EJC for bus conductors and other evidence to show that it makes excellent electrical joints. The purpose of this paper is to give our sales force ammunition to combat aggressive competition and sales resistance they are now encountering.

7-E-9a. Mr. Tompkins raised the question of continuing tests on mineral insulated conductor (JO-XE273). General Cable has not been able to supply this type conductor in commercial quantities. It was agreed that the tests be discontinued. Mr. Englehart advised they are designing a large-scale experiment on all types of silver-plating. Mr. Tompkins said as long as the test was purely for resistance to corrosion the use of bolted joints in the corrosion test did not seem justified. However, Mr. Hartmann and Mr. Englehart both pointed out that different results were obtained from bare bus and bolted joints and to make the test complete both should be tested.

Mr. Englehart said there is no difference in performance in salt spray test between economy grade and quality grade fixtures manufactured by Leviton Manufacturing Co. Mr. Cope pointed out the reason for these tests was to assist Leviton in going to Underwriters to get approval on outdoor lamp sockets. It was pointed out that Leviton has not made fixtures to specifications for outdoor use and that their product could be classed as extremely light duty. These products were not intended for industrial applications such as Alcoa has, but since Leviton is a good Alcoa customer we should do what we can to help improve their products.

7-G-1. It was decided to remove XE-17, Electrical Conductor Containing Boron, from the Problem List.

Mr. Englehart reported that aluminized steel wire after [fol. 5306] one year's exposure to 3½% salt spray, 100% relative humidity at 125°C has continued to show superiority to standard hot dip galvanized wire. Mr. Kessler raised the question of the necessity of the continuity test on aluminized core wire, pointing out that if enough tests are

made, almost any lot will eventually pass. Mr. Coffin pointed out that recently Mr. Holcomb had been setting up a statistical quality control system with Page. After they have this going he thought test work which we are doing, which is in a sense a repetition of their tests, would indicate improved quality, and for this reason did not wish to discontinue our tests. Mr. Coffin pointed out that we are getting considerable business because of aluminized core wire and it would be a mistake to discontinue our test programs because it is very important to be able to tell customers we are making every effort to see that they get a first-class product. Mr. Engelhart reported that investigation is under way for obtaining a more rapid evaluation of the continuity of aluminized steel core wire in the hydrogen evolution test.

Mr. Engelhart reported that Alumoweld wire under JO XE-296, has shown up quite satisfactory, although they are rather extensively contaminated with copper smears. Alumoweld steel wire could possibly be used for cables for Stockbridge Dampers and may have superior damping characteristics. Such cables have been prepared using aluminized core wire.

2-G-3. Mr. Hartmann read Mr. Sawyer's report, Protective Coatings for Steel Core Wire. Mr. Hartmann pointed out that three greases are being investigated by ARL, the most promising of which appears to be Kenlube B-521. Mr. Coffin made the motion that the use of Unoba A2 be continued until the results of research study were available [fol. 5307] at which time the problem would be reviewed for decision on what product to use. Mr. Kessler seconded the motion and the motion was carried.

7-G-4.1. There was considerable discussion on the proper use of test data showing the superiority of Alcoa armor rods over Preformed, both as to the reduction in conductor vibration and increased fatigue life (JO 16-202). It was agreed that until the full story is developed it would be unwise to make any publication. Mr. Hartmann suggested a printed report for internal circulation. This type publication would not hurt our relationship as much with Preformed Line Products Co., who are also a customer.

It was decided that JO 16-76, Effects of Various Armor

Rods on Lengths of End Loops on 397,500 cm ACSR and 795,000 cm ACSR, be dropped from the Problem List.

There was considerable discussion concerning the development of dampers for structural members (JO 16-108) and the promotion of aluminum transmission towers and substation structures. It was agreed that most of the vibration of transmission tower members was induced from the transmission conductors rather than wind forces acting on the members themselves. Mr. Coffin pointed out that early in October a group from the Philadelphia Electric Co. were coming to Massena and that he would like to have a good story on the use of aluminum towers from ARL. Mr. Hartmann replied that this suggestion would be followed up. Mr. Kessler pointed out that on the radar towers constructed of structural aluminum on the DEW line in Canada, many of the component parts were manufactured at Massena and that there were no complaints because of vibration, where winds occur all the way from 0 to 100 mph. Mr. Wagner pointed out that in all substation structures [fol. 5308] at Alcoa plants no trouble had been caused by vibration induced by wind. It was pointed out that the cross-arms on the Cedars Towers had shown no signs of vibration and it was generally conceded that aluminum towers would have no more tendency to vibrate than most steel towers. However, it is appreciated that aluminum has less fatigue strength. Mr. Tompkins pointed out the need for an effective damper for tubular bus such as used at Wenatchee, which would preferably go inside the bus. Mr. Hartmann cautioned that when aluminum towers are used an educational program on the use of aluminum bolts will also be necessary as many riggers using these bolts for the first time will twist them off.

Mr. Dallye raised the question if reports on the Sacramento River Crossing and Joppa Crossing, JO 16-177 and 16-152, should be dropped. Mr. Tompkins pointed out that a great amount of work and money had been spent on both of these projects and it would be well to have a final report. It was pointed out that the trouble on the Sacramento River Crossing has not been solved yet as they are having trouble with damper failures and have recently ordered a new supply.

Mr. House reported the development of a new hot line

recorder for vibration records which works very satisfactorily (JO 16-370). Mr. Hyde in his recent visit to Massena thought that it would fill the bill for the field men. Mr. Tompkins suggested that it be installed on the St. Lawrence River Crossing Towers, in the Cedars circuits, as he wished to have vibration information on this span. It was agreed that this should be done. Mr. House reported that natural vibration tests of 795,000 cm ACSR 26/7, containing 2 coated strands had been in progress for some time (JO 16-393). Visual inspection of these conductors from the ground does not indicate that much damping [fol. 5309] is taking place.

It was agreed to discontinue JO 16-119, Vibration Fatigue Tests of X6064 Alloy Wire, and JO 16-200, Tests of 400-ft Spans of ACSR and Galvanized Steel Wire to Compare Self-Damping Characteristics.

Mr. Hartmann spoke briefly about the proposed papers on Early Vibration and Fatigue Tests on Stranded Conductor (JO 16-419). All members of the committee who have any information on early dates were asked to write Mr. Simpkins. It was suggested that perhaps Mr. Hemeter could be helpful.

7-G-4.2. Mr. House reported on JO 16-242, Natural Vibration Tests on Bundle Conductors. These tests indicate that armor rods do not have the same beneficial effect in reducing vibration in bundle spans that they have on a single conductor. Mr. Dallye asked about the use of armor rods on the G.E. Extra-high Voltage project, pointing out that dampers were going to be used and most of the spans would be bundled. With the large shielding rings there would be practically no chance of flash-over near the suspension clamp. Mr. Tompkins pointed out that the only reason for using armor rods other than to suppress vibration and protect against flash-over, would be to protect the conductor at the suspension clamp. He did not feel that this would justify the use of armor rods, as modern clamps would not be expected to damage the conductor. Mr. Dallye also pointed out that the contemplated changes during the test program on the G.E. EHV project were considerable and in many cases the conductor would probably have to be moved in the suspension clamp in which case the presence of armor rods would greatly complicate the work and in-

crease costs. It was agreed that armor rods should not be used on this project.

[fol. 5310] Mr. House reported on JO 16-259, Investigation of Longitudinal Motion of Bundle Conductors, which is a fatigue test of the spacers. Mr. Turner reported on the Bonneville system, where bundle conductors had wrapped around each other. It was pointed out that Mr. Mather of Bonneville considers our test much too severe and Mr. Tompkins agreed. However, it was pointed out that every type spacer that had been in service in Europe is now beginning to give mechanical difficulties, consequently there is no proven spacer on the market. By such a test as ours we may develop a spacer that would be far superior to any yet made available commercially. Mr. Dallye reported that he had checked with Mr. Gross concerning the condition of the Alcoa articulated spacers which had been in service on the Muskingum-Tidd circuit of the American Electric Power Corp. Mr. Gross reported that some had been taken off. After 2 years of service there were no markings on the cable and no wear on the spacer. They were quite pleased with the service so far. It was pointed out that Preformed has probably had trouble with Preformed spacers abrading the cable which might be the reason for the polyvinyl jacket on the end portions of the Preformed rods. Closed spring spacers were discussed and it was pointed out that the closed spring must be made of stainless steel or some other noncorrosive material. The possibility of an aluminum alloy spring was suggested but it was thought that such a spring would probably take a permanent set during unusual movements that occur during nonuniform ice unloading. Mr. Dallye raised the question if all 3 type spacers should be installed in the G.E. EHV project, namely, articulated type, unibal type and closed spring type. It was agreed that this should be done.

[fol. 5311] 7-G-4.3. Mr. Rawlins reported on JO 16-97, Study of Stockbridge Dampers, being carried out by analog computer. It was thought at the time of the last meeting that we were very near a circuit which accurately imitated the performance of dampers. Recently 2 series of check tests have been made, the first of which checked very well, the second of which did not check close enough. Ac-

cordingly, further steps are being taken to get a more accurate circuit. Once a satisfactory check has been obtained a complete line of dampers will be devised that will cover the full range of conductor size and span lengths to be protected. Mr. Dallye pointed out that when this system is developed it will be very helpful in dealing with the customers. Mr. Tompkins raised the question if we should go ahead with what we already know and design an improved set of dampers. Mr. Hartmann replied that this could have been done 6 months or a year ago, but that we are so near a more complete solution that he believes that the work should be completed, which he hopes will be soon. Mr. Coffin raised the question of there being a patentable damper design arising from this work and Mr. Hartmann replied that that was a good possibility and was being investigated. Mr. Coffin advised that he had been approached several times by the Anderson Electric Co. to get into the damper business. Mr. Coffin feels in light of the amount of money and time Alcoa has invested in this program that we should not let any other manufacturers in on the deal. Mr. Coffin pointed out that if a new line of dampers is developed it would be a sales advantage to have them look different from the present line. When the new line of dampers comes out a technical paper should be published, to exploit the work that has been put into the new design.

[fol. 5312] Mr. House explained that JO 16-292, Investigation of In-Span Damping Devices, is in effect a model test of the Sacramento River Crossing. The damper and weights at the third point were quite effective, indicating that Mr. Tompkins' original solution is sound. Mr. Coffin inquired if this information has been passed on to P. G. & E. Co. Mr. House advised it had been. Mr. Coffin said he was expecting to be in San Francisco in the near future and would discuss the matter with them. Mr. Tompkins pointed out that the mathematics of the weights at the third point with the 2 dampers on each side had been analyzed very well but the use of 2 dampers only at the third point had not been analyzed mathematically. He suggested that this be done, perhaps securing outside services of such a person as Dr. Merrill who has done work in the past for Alcoa. Mr. Hartmann advised that he thought

Messrs. Rawlins and House should work out a plan and, if it seemed desirable, Mr. House could contact Dr. Merrill.

Under Investigation of Festoon Dampers, JO 16-201, Mr. Simpkins reported that we now have the test spans of 400, 300 and 500 ft in series and tests to check the vibration characteristics of undamped spans are now progressing. Mr. Coffin pointed out that he recently discovered that Copperweld has a patent on a spiral damper which they have been selling for use on Copperweld conductor. This could be the damper we need for small conductors. Mr. Coffin advised that if the E. C. Lab would tell him what we need for the outdoor spans he would get these from Copperweld for evaluation.

Mr. Tompkins questioned the value of high humidity tests for Stockbridge Dampers or other products (JO 16-364). Mr. Englehart said this was a good comparative test and was quite useful in evaluating the differences between platings, paint and other types of finishes. [fol. 5313] It is planned to compare Stockbridge Dampers which have been immersed in No-Ox-Id and those that are perfectly clean.

7-G-5. Mr. House explained that there had been no testing done at Tidd for over a year (JO 16-187). Considerable testing was done on grit-blasted conductor but supplementary tests on mill-run conductor had never been made. Mr. H. L. Rorden of the American Electric Power Corp. advised that it would take approximately \$5,000 to relocate the power supply which was necessary because of new construction. It has never been clear who was to spend the \$5,000, whether it would be American Electric Power, Alcoa, or both. Mr. Rorden said that before anything could be done they would need a communication from us stating that we were interested in completing the tests. After considerable discussion it was finally decided Mr. House should write Mr. Rorden to obtain full details, then the matter would be taken up with interested parties on the committee.

Mr. House reported on the recent inspection trip made to the experimental test circuits of Public Service Co. of Colorado at Leadville (JO 16-263). A brochure on the project, containing a number of photographs, was passed among the members of the committee. It was reported

that all of the data had been recorded graphically and was sent to East Pittsburgh for processing. No information has been released by Westinghouse concerning any of the results. However, considerable newspaper publicity was given to the AIEE group that made the trip to Leadville. Mr. Tuttle raised the question as to who in Pittsburgh was contact man between Westinghouse and Alcoa on this project, and Mr. Coffin replied that since Mr. Phillips' death no one had been assigned to this, but that it would be Mr. Sandell.

[fol. 5314] Mr. House reported that a report on the emissivity project with Purdue has been received in the form of a thesis by Mr. Rigdon, with supplemental letter reports (JO 16-274). The question was raised concerning tests of about a dozen more samples which were exposed in our Santeetlah and Alcoa installations which would give a relationship between emissivity and time of exposure from one month up to one year. It is estimated that this work would cost between \$500 and \$1,000. It was the consensus that this work should be completed and the results reported in a technical paper. Mr. House will write Dr. Grosh.

Mr. House reported on the status of the X & R Tests and Electrical Characteristics Booklet (JO 16-276, 16-339, 16-397). The thermal characteristics data have been approved by the Editorial Committee and are now in the hands of the printers. Work on the reactance and resistance is being rushed. Mr. Guess explained that the new policy on the Electrical Characteristics Booklet was to have several component parts in a loose leaf binder all in the same style printing. Mr. House inquired if the new Thermal Characteristics Booklet would be out by the first week in October for distribution at the EEI meeting in New York, and advised that Mr. Sanford had asked him to prepare a Table of Current Values for Stranded Aluminum Conductor over the full size range so that the current required to bring any given conductor up to 125°C could be immediately read off. This has been done and on the same sheet are the so-called normal ratings of conductor for both still air and 2 fps. Mr. House advised that he did not like to distribute this information prior to the coming out of our new booklet and Mr. Guess hoped we could stall until the

book would be out. The Publications Department later [fol. 5315] suggested advising that the material had been abstracted from a copyrighted Alcoa publication.

Mr. Coffin commented that he would like to have some X & R data of Alumoweld Wire, both when used for a core wire and when used as a 7-strand conductor. Mr. Tuttle advised that at present the conduit test is scheduled and then these tests on Alumoweld could be worked in. Mr. Guess emphasized that Mr. Tuttle should not spend any time on other tests until the X & R Booklet is out. He would like to have the data by November 1st in order that we can get booklets out before any other manufacturers get out similar data. It was agreed that Mr. Wagner contact Mr. House to discuss using one of his men who has completed his work in the construction of the St. Lawrence Plant additions. This was subsequently arranged and Mr. Greathouse is assisting in the drafting of the booklet. It has also been arranged that Mr. W. B. Howitt will assist Mr. Tuttle in the computations.

It was reported that the High Current Tests Relative to REA Approval of Polyethylene Triplex (JO 16-345) had been completed and 8 reports sent to Mr. Lewis for presentation to the REA. Mr. Guess reported that Mr. Lewis is making good progress toward getting polyethylene approved.

The Extra High Voltage Project which G.E. will conduct near their Pittsfield Plant, in which Alcoa is a participant, was discussed at length. It now appears that the project will probably cost \$250,000 over a period of 4 or 5 years instead of the \$125,000 originally estimated. This is because of a large number of added features such as all-aluminum substation structure and aluminum lightning rods on various towers. It was agreed that if we did not [fol. 5316] fully participate it would mean the entrance of our competitors into this project. The general plan for handling the expenses would be for ARL to prepare an R. for A. based on estimates by Mr. Larson and Mr. Dallye. It was suggested that the 1959 ARL Budget should carry an item under 10-J.

7-G-6. Mr. Tompkins inquired if annealing tests of ACSR at Purdue, JO 16-160, would be worked into a paper. It was reported that this had been agreed to at the last meet-

ing and would be done. It will also be part of Mr. Rodee's paper on sag tension. There was considerable discussion concerning the use of tensile creep tests of 397,500 cm 19-strand all-aluminum conductor at room temperature and at 95°C which was covered in an ARL formal report, by Mr. W. B. Howitt. Some of this information had been used in a paper by Mr. George Phillips for South Eastern Electric Exchange Meeting in Biloxi. Mr. Coffin advised that portions of it would appear in an article in "Electrical World" in the near future. Mr. Tompkins pointed out that this is very valuable information and should be worked into an AIEE Transactions Paper. It was agreed that this should be done. It was agreed that tensile creep tests on 1.75 in. diameter Expanded ACSR would be left on the Problem List.

There was considerable discussion concerning the merits of Properzi Rod (JO 16-329). It was reported that this process was very good for small operators but for large concerns such as Alcoa it would require too many machines. The actual cost of conventional rod at both Vancouver and Massena is estimated to be only a small fraction of a mill higher than Properzi Rod made at Vancouver.

The question was raised concerning the publication of the icing tests of stranded conductors (JO 16-355) originally suggested by Mr. E. L. Peterson of the American Electric Power Co. Mr. Coffin expressed the opinion that it should be a joint paper by Alcoa and Mr. Peterson, as he had been a faithful friend of Alcoa even though A. E. P. Co. is throwing business to Kaiser at the moment. However, Mr. Coffin feels that Mr. Sporn has had some unpleasant experience with Kaiser products and is beginning to mellow toward Alcoa. It was agreed that Mr. House should work through Mr. Gross on the joint paper with Mr. Peterson.

Mr. Simpkins reported on tests on EC-H19 Wire which had been flexurally hardened through rollers (JO 16-372, 16-373). The higher tensile creep strength and recrystallization temperature predicted by Armour has been confirmed. Mr. Kessler raised the question as to the practical use of this information. After considerable discussion it was agreed that Mr. King would take this up with the Central Metallurgical Department.

It was reported under JO 16-396 that rotating beam fatigue tests on additional samples of Alumoweld wire revealed an endurance limit of 35,000 psi as compared to 29,000 psi for the original samples. Mr. Hartmann pointed out that all the Alcoa test data on Alumoweld was covered in a recently issued summary report.

It was reported under JO 16-417 that losses in aluminum conduit would be determined and compared with losses in steel conduit obtained during tests that G.E. made several years ago. This test is designed to show the superiority of aluminum conduit both during normal operating conditions and under short circuit conditions and to investigate the integrity of standard coupled conduit joints under short circuit conditions. The results should be valuable to both our sales and engineering departments.

[fol. 5318] Mr. Kessler discussed under JO 16-422 the proposal made by Kaiser to the ASTM Committee B-1, Subcommittee VII—Task Group 17, concerning the use of cold welded joints on the outer strands of 7-strand conductor. No welds would be in the center strand and the welds on the outer strands would be limited to 50-ft intervals. The reason for this proposal is to obtain longer lengths of conductor. Mr. Coffin expressed the opinion that this move should be killed if possible because it would confuse the competitive situation and lead to complications in reels. Mr. Kessler said he felt there was a good chance of discouraging its adoption because fatigue tests show the wire with these welds to be inferior to normal. It was agreed that Mr. Kessler should discourage the Kaiser proposal.

7-H-2. Mr. House called attention under JO 16-141 to the test results on the remaining connectors of the first group installed at Sutro and the performance of connectors installed about a year ago. At the last meeting it was decided to taper off at Sutro and when all connectors were out of circuit to put no more in. It was pointed out however that this is a very excellent contact with P. G. & E. and once we pull out it may be hard to get back in. Mr. Englehart expressed the opinion that if we could produce a product that would stand up under this severe environment we would really have something to shout about. The test has been relatively inexpensive and the site is convenient

to San Francisco as compared to the Jenner Test Site which is 75 miles north. It was the consensus that we keep something going at Sutro as long as the P. G. & E. people were willing to have us participate.

Under JO 16-387, Evaluation Test of Modified Alcoa No. 2 EJC with Acrawax, Mr. Dallye questioned the use [fol. 5319] of term "unstable resistance" and suggested "erratic resistance ratio". Mr. Lanctot will check the records and make any necessary corrections. Mr. Hartmann called attention to Mr. Sawyer's report, starting on page 38 of the ARL Progress Report, covering other work on Alcoa No. 2EJC.

The heat cycle tests at 150° and 200° C operating temperature of conductor, JO 16-413, were initiated because of the EEI Performance Specification Task Force work where tests above 100° C were advocated. The clamps have operated satisfactorily for over 500 heat cycles. The temperatures have been raised by increasing the current and now the conductor temperature is approximately 400° C. None of the p. g. clamps have failed, although those that were assembled without any joint compound have considerably higher resistance ratios than those with No-Ox-Id and Alcoa No. 2 Joint Compound. These connectors have a resistance ratio below 1. The reason for these higher temperatures was to check a theory advanced by Armour Research Foundation that at 212° C an aluminum joint completely disintegrates and resistance ratio and temperature take a very sharp increase upwards. Our tests have not borne out this contention.

7-II-4. Mr. Englehart reported that the Chemical Metallurgical Div. had been overloaded with a considerable amount of work on the panel testing and consequently a great deal of the electrical work in their division had been delayed. He reported that additional help has been secured and better progress is expected. Under XE-238 Mr. Kessler raised the question whether the 50-50 solder was enough better than 802 solder to warrant its more difficult application. Mr. Kessler advised that they would like to go back to the 802 because it is more economical. It was agreed that 50-zinc and 50-tin solder would be discontinued and 802 would be used in the future. [fol. 5320] It was pointed out that development work is

underway for an improved 805 solder for use for sale through commercial outlets. Mr. Kessler reported it was his understanding that there is a flux of 805 solder which is water soluble, and noncorrosive so it need not be removed from the finished product. Mr. Kessler said that he would not use this new 805 solder till Mr. Englehart gave the word to go ahead.

10-F-35. Mr. Hartmann reported on Mr. Howell's work on the standardization of electrical conductivity measurements of various alloys and temper (JO 9-10644). Mr. Hartmann asked Mr. King to introduce the subject of the improved conductivity of No.2 EC. In connection with his work with Cressona and Lafayette discrepancies in conductivity were discovered. This was traced to the use of the Magnatest Meter for conductivity measurements and Mr. King advised that he considered the variation in measurements entirely too high for this type work. He pointed out that Mr. Howell had recommended that all plants go to the potential drop method as recommended by ASTM. Cressona does not feel that they are justified in going to the potential drop method. They claim that measurements by the potential drop method will cost over ten times as much. There was considerable discussion concerning the relative merits of the Magnatest and the bridge method for measuring conductivity. Mr. Coffin strongly urges that the standards not be lowered and all agreed that the Magnatester was not accurate enough for the conductivity measurements which our advertising claims. Mr. Guess made the motion and Mr. King seconded it, that this Committee go on record as stating that the bridge method for conductivity measurements is necessary to maintain proper high standards. Mr. Guess pointed out that we should watch any new developments in method of measuring conductivity and if some quicker and cheaper method of the required accuracy becomes available that we should investigate it. Mr. Coffin pointed out that he expected to get out a letter to all conductor salesmen, pointing out that all electrical conductors could be guaranteed 62.0% minimum conductivity. Mr. Guess reported that he had checked into this with the Central Metallurgical Division and they agreed that we could safely guarantee 62.0% conductivity on all EC Conductor, bus bar and wire

products. There was considerable discussion on the material to go into Mr. Coffin's Memorandum. It was pointed out that General Cable was buying Alcoa rod where they have to meet the 62.0% specification. It was reported that 62.0% conductivity material was costing Anaconda 5 cents more per pound.

VIII. Miscellaneous Items

The cooperative test program with Okonite was discussed briefly and it was pointed out that samples covered with polyethylene had been sent to Okonite for comparative tests with Neoprene insulated conductor which had failed in service at some of the Alcoa plants. It is believed this test will convince Okonite that polyethylene is much more effective as a cable covering than Neoprene which will admit moisture causing corrosion.

Mr. Kessler reported that degassing equipment for improved quality cast accessories has been installed.

There was considerable discussion concerning the preparation of a paper on the aluminum bus in the Massena Powerhouse which has been in operation over 50 years and will be dismantled in the near future. It was emphasized that all necessary pictures should be taken without delay. Mr. Wagner thought that it would be helpful if Mr. Lancot [fol. 5322] assist in the preparation of this paper. However, subsequent to the meeting Mr. Lancot checked with Mr. Prashaw and found his work was well under way and that this assistance was not needed. Mr. Pitman is heading up the actual preparation.

Mr. Kessler reported that in accordance with the minutes of the last meeting, greater activity in the Wire Association was under way. He pointed out that in presenting papers at these meetings, Kaiser has led the field by far. Mr. Coffin urged that in any papers we present we do not want unwittingly to give away any of our know-how. It was pointed out that the Wire Association does not concentrate wholly on electrical conductor but is interested in all applications of wire. Mr. Kessler reported that Alcoa had not been invited in the original setup of the Wire Association but Mr. Kessler, through negotiations, became a member of the committee.

Mr. Kessler reported that as part of the cost reduction

program changes in the length of lay have been investigated. He reported that Mr. Rodee was against any change. Mr. Rodee's position is borne out by recent difficulties Kaiser has had with having to take back considerable amount of ground wire which had an extra long length of lay of aluminum and a short preformed length of the steel, resulting in failure of the aluminum strands.

Mr. House reported on the work of the Edison Electric Institute, Steering Committee on Aluminum Connectors, and pointed out that Alcoa is the only manufacturer that has been against their proposed method of test, maintaining that such a method would allow inferior clamps to be accepted and result in a great deal of harm to both the public utilities and the use of aluminum for such fittings. The so-called performance specification is not really based on any work done at the Armour Research Foundation, al-[fol. 5323] though that supposedly was the goal of this program. The difference in measurements and ratings of clamps was explained and it was pointed out that the proposed method favored poor clamps and did not particularly help good clamps. It was pointed out that the proposed method penalizes a connector with a resistance ratio below 1 and aids a connector with a resistance ratio above 1. Mr. Hartmann asked if we should work through ASTM where a standard method of comparing joints might be adopted. It was pointed out that perhaps Mr. George Stickley's group could handle this through ASTM, to get a standard method of making comparisons of electrical connectors. Mr. Hartmann agreed that he would contact Mr. Stickley.

Stab connections to aluminum bus bar were discussed and Mr. Chapman pointed out Mr. Gunther's opposition to silver plated aluminum bus bar. However, it was recalled that it had been previously decided not to approach the Underwriters' Lab on this problem. It was agreed that Mr. Chapman would procure several different types of silver-plated stab connectors in order that Mr. Englehart could start some corrosion tests.

The question was raised by Mr. Hartman concerning the tests of aluminum anode bus connectors which had been on the books for some time. All the samples are on hand. It had been previously decided that since the new designs

had been completed the information from the tests was not badly needed now. Mr. Wagner pointed out it would be better to wait until the new potrooms have had experience with their present connections, so it was agreed to let the matter remain inactive for the present. It was estimated that any work on anode bus tests could not be started before the next meeting of the Subcommittee and probably [fol. 5324] not for a year. It would require 2 months to run the tests. Mr. Wagner agreed that if the tests were needed sooner he would advise interested parties.

Mr. House asked for an expression from the committee on the purchase of a creep machine for elevated temperatures, advising that he had recently secured a firm quotation on a suitable piece of equipment. Motion was made by Mr. Guess and seconded by Mr. Cope that the R. for A. be prepared showing that the Subcommittee had recommended purchase of this machine. The motion was unanimously carried.

Mr. Wagner reported that Mr. Gunther had brought up the use of aluminum in safety switches, which are now universally made of copper. This would be an excellent outlet for aluminum if the details of the application could be worked out. It was pointed out that there were many home-made aluminum disconnect switches at some of the company plants, however, these are merely isolating switches and do not break load. Mr. Wagner reported that good progress is being made in the manufacture of aluminum outdoor disconnect switches for high voltage switchgear. However, the use of aluminum in safety switches is at a standstill. It was agreed that Messrs. Cope and Chapman would follow this project and report back to the committee as to the possibility of developing this market for aluminum. Mr. Wagner said that they would be glad to try any equipment in the plants and give any assistance in the design of terminals and other features.

Mr. Guess reported that Messrs. Rodee and Sandell had been working with IBM people to develop an IBM method for sag tension calculations. Mr. Hartmann reported that considerable work had been done at ARL on IBM programming. Mr. Tompkins reported that they were doing work with Dr. Whidden on studies for the new plant in Suriname.

Mr. Tompkins inquired if there was any effort to increase [fol. 5325] the staff of the ARL Electrical Engineering Div. and Mr. House reported that 2 new men had been acquired this year. Mr. Hartmann pointed that while we were not actively searching for new men we were interested in knowing of outstanding prospects from outside or through plant transfer.

Mr. Tompkins asked about the status of the electrical measurements laboratory and extending its use. It was pointed out that if the services of the measurements laboratory were widely used by the company plants more personnel would be needed. Mr. Wagner expressed some doubt as to just how much the measurements laboratory could be used by the plants and it was pointed out that when standards are checked, such as rotating standards, the work is done by the local power companies, so that errors resulting from shipment would be avoided. It was generally agreed that the measurement laboratory was in excellent position to help Massena Works and has done so.

IX. New Projects

Mr. Coffin said he would like to get some X & R tests run on stranded Alumoweld as soon as possible.

It was reported that duPont had shown considerable interest lately in aluminum blasting wire and that we are supplying them with some 5005 samples for evaluation. One of the main difficulties is joining to the blasting cap. Mr. Chapman reported that the customer usually does not know what properties they want, some want extra elongation so as to avoid breakage of the wire, and there seem to be a great many unanswered problems. Mr. Kessler had previously pointed that one of the things that made aluminum wire attractive was that there are some blasting operations where minerals are being mined that could not stand any contamination from copper but that aluminum is [fol. 5326] satisfactory. Mr. Coffin pointed out that Alcoa's own Mining Division had put the use of aluminum blasting wire on the shelf because of difficulties in trying to use it. Mr. Coffin stated there is quite an extensive report on this. Mr. Kessler reported that Hercules had an aluminum clip that seems to work satisfactorily with the clamp to connect

the cap to the wire. It was estimated that there is a potential market of 3,000,000 pounds annually in this product.

X. Priorities

The question of priorities was discussed and the possibilities of a more formal list with serial numbers which would separate the various projects in respect to the laboratory equipment needed and personnel required. It was pointed out that such a system would require more paper work and it was the opinion of Messrs. Lanctot, Simpkins and House that such a system would not be justified. Priorities are fairly well taken care of under the present informal system. It was pointed out that there are always new projects coming up, some of which take priority over all other work, in which case the whole schedule would become obsolete. It was the consensus that the present handling of priorities was working out satisfactorily and that this scheme should be continued. Any members having projects in mind which they think should be given top priority were urged to communicate with interested parties to help arrange the necessary changes.

[fol. 5327] 1959 Budget

The 1959 Budget was discussed by Mr. Hartmann and he called attention to the addition of three \$2,000 items to the previously prepared budget summary. These items are conduit, bus bar, and foil used for shielding. Mr. Hartmann explained that the work on bus bar would be work carried out by the Metallography Div. on the study of theory of electrical joints, while the other two projects were by the Chem. Met. Div. It was pointed out that Item 7-H-6 should be corrected to Electrical Tests of Bus Accessories. The budget was discussed at some length and especially the question of the cooperative EHV project with G.E. Mr. Tompkins raised the question if some of the items on the budget should not be joint projects with other aluminum producers, and Mr. Hartmann pointed out that this is under study but generally Alcoa likes to publish its own data on the properties of its products, and not depend on competitors' data. It was pointed out that the results

of the research work we report in our publications and papers brings great prestige to Alcoa, and Mr. Coffin expressed the opinion that this was a valuable sales aid and good advertising. It was pointed out that the Electrical Engineering Div. is one of the divisions of ARL whose work is most closely tied in with Sales. It was pointed out that the Budget is about 1% of electrical conductor sales. Mr. Tompkins made the motion that the budget be approved, seconded by Mr. Guess, and unanimously carried.

The meeting was adjourned at 2:45 P.M. on September 11.

HEH:ECH/F
10-30-58

[fol. 5328] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 155

Mr. T. L. Gilbert

July 27, 1959.

From: D. R. Little
To: Mr. J. R. Pellegrino

Re: R/A M-2520

Please cancel R/A M-2520—Purchase and Install Neoprene Extruding Equipment and Rehabilitate the Balance of Bldg. 14 for Occupancy.

D. R. Little.

DRL:CM

CC to Messrs. E. G. Schoeffel, N. B. Lane & L. M. Arbegast, K. O. Cogger, T. L. Gilbert, J. A. Hagen, C. L. Kessler, J. S. MacKillican, G. E. Martin, R. W. Knapp—Pgh. Office.

[fol. 5329]

Mr. T. L. Gilbert

Nov. 14, 1958
M-2520

Aluminum Company of America, Massena Fabricating

Purchase and Install Neoprene Extruding Equipment and Rehabilitate the Balance of Building 14 for Occupancy.

475,000

11-14-58

34,825

440,175

HBL

[fol. 5330] This request is for funds to:

1. Purchase and install equipment for a continuous vulcanizing extruder line for rubber and neoprene insulating of aluminum conductors.
2. Revise the unclosed and unheated portion of Bldg. 14 to house this equipment and provide area for in-process material handling and storage.
3. Purchase and install test equipment in Bldg. 83 for in-process control of neoprene compound.

All of Alcoa's neoprene and rubber insulated conductors are presently being produced by Rome Cable Corporation under a toll arrangement. The facilities covered in this R/A would make possible the almost complete elimination of Rome Cable's services on our present line of covered conductors; i.e., line wire and service drop. At the same time, an annual savings of \$165,000 to \$190,000 would be realized, based on the 1957 sales of our neoprene products. Since the total required for the installation will be \$475,000, contingencies included, the project would return the investment in roughly 2.7 years. This savings is particularly important because all of it represents "out-of-pocket" money that the Company is spending at the 1957 level of business.

For our cost savings analysis, the following assumptions were made:

1. Neoprene scrap loss is figured at 15% Vs. actual 10% for current polyethylene scrap loss.
2. Using extruding techniques recently developed by DuPont, we should realize machine speeds from 2 to 2½ times those of Rome Cable's extruder speeds.

3. R&M for neoprene equipment is estimated to be 50% higher than the present plastic extruder line, partly due to the necessary high-pressure steam system.
4. Neoprene materials costs will amount to \$.258 per lb., based on recent quotes from a custom compounder.
5. Rome costs were obtained from the most recent cost statements and represent the actual cost to Alcoa for the work performed by Rome Cable.
- [fol. 5331] 6. Transportation savings would be the actual 1957 cost to Massena for shipment of conductor to and from Rome.
7. With the addition of the proposed equipment, burden rate on existing equipment would be modified to reflect better utilization of fixed expense and certain items of variable expense.

A number of favorable aspects that we see accruing to Alcoa from such an installation follow:

1. Customer acceptance of Alcoa neoprene products may be improved if manufactured by ourselves instead of by Rome Cable.
2. Rome Cable would be needed only for special constructions that amount to less than 1% of our present covered conductor sales.
3. Rome Cable would not be in as favorable a position to know Alcoa's covered conductor sales picture. Such information may be used to Alcoa's detriment at present.
4. Control of neoprene product quality within Alcoa's own organization would insure a higher level of quality.
5. More producing equipment, and thus more salable product, will give us better absorption of our Covered Conductor Dept. fixed expenses.
6. The new facilities would enable us to produce neoprene products at a rate of 3,000,000 pounds aluminum weight per year on a 15-shift operation.
7. We would be able to produce rubber-insulated high-voltage cables if required.

8. Traffic problems would be simplified, and deliveries could be bettered, especially in cases of combined bare and covered shipments.
9. Warehouse stocks of neoprene products could be considerably smaller than the present combined stocks at Rome and Massena.
10. Enclosing and lighting the balance of Bldg. 14 will eliminate a bad winter working condition, as we use the unheated portion of the building for in-process storage, and below-zero temperatures within the building are not uncommon.
11. Experience thus far will allow us to avoid many of the modifications that were costly R&M items during our first 18 months of operation of the present polyethylene line.
12. This proposed continuous vulcanizing line could readily be used for insulating with the new cross-linked type of polyethylene that gives promise of improved abrasion and heat resistance, as well as lower material costs.

[fol. 5332] It is estimated that the equipment would be in operation in 12 to 16 months from the approval of this R/A. At the 1957 neoprene product sales level, the equipment would be utilized 1.2 shifts per day.

[fol. 5333]

Estimated Cost

	Material	Labor	Burden	Total
Summary				
Revisions to Bldg. 14	\$ 76,700	\$30,000	\$16,300	\$123,000
Substation & power distribution	20,800	3,400	2,100	26,300
Equipment including P.T. Lab. Equipment	234,325	32,375	16,425	283,125
Total	\$331,825	\$65,775	\$34,825	\$432,425
Contingency				42,575
				\$475,000
 Bldg. 14 Revisions	 \$ 31,000	 \$15,200	 \$ 8,450	 \$ 54,650
Heating	8,000	9,000	4,500	21,500
Lighting	21,000	4,800	2,800	28,600
Sprinkler system	15,000			15,000
Misc. Services	1,700	1,000	550	3,250
Total	\$ 76,700	\$30,000	\$16,300	\$123,000
Substation & Power Distribution	\$ 20,800	\$ 3,400	\$ 2,100	\$ 26,300

Equipment

Entry section.....	\$ 41,550	\$ 4,575	\$ 2,200	\$ 48,325
Extruder section.....	19,975	800	425	21,200
Vulcanizing section.....	21,600	3,050	1,575	26,225
Take-up section.....	57,400	5,550	2,800	65,750
Quality control.....	7,700	800	475	8,975
Physical Test. Equip.....	7,600			7,600
Steam generation.....	9,500	5,200	2,600	17,300
Major Elect. drives.....	59,500	8,200	4,250	71,950
Foundations & trenches.....	1,000	4,000	2,000	7,000
Neoprene dieler.....	8,500	200	100	8,800
Total.....	\$234,325	\$32,375	\$16,425	\$283,125

Firm quotations on all major equipment have been obtained and sufficient engineering has been done to make this estimate realistic.

11-14-58 G. E. Martin:EM

11-14-58 GEM

11-14-58 TLG

11-14-58 KOC

11-14-58 DL

11-14-58 LMA

11-14-58 JAG

11-14-58 CLK

[fol. 5334] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 156

This Copy for: Mr. T. L. Gilbert, Massena Works

Internal Correspondence

January 13, 1959.

From: T. I. S. Boak, Jr.
Pittsburgh Office
To: Memorandum

Re: Capital Expenditure Committee Meeting Notes
January 8, 1959

The following matters were discussed in the meeting noted above. Approval of all of the items noted below was recommended by the full Capital Expenditure Committee.

Detroit—CDV-669-R—Furnace Repair Revision—\$4,500 revision. This revision covers an increased cost of repair to the furnace which was not foreseen until the repair job was well under way.

Franklin—NP-514—Extension of Rural Lines—\$70,000. NP-513—Expansion of Service on Existing Lines—\$220,000

These requests have to do with the Nantahala Power and Light Company's being able to extend service as the requirements of its customers demand. Approximately \$250,000 each year has been spent since 1950. It is estimated that \$107,000 income will be generated as a result of the service extension.

Lafayette—L-29972—14,000-Ton Press. Mr. Jones discussed with the committee the critical situation surrounding the need for the installation of the 14,000-Ton press at Lafayette. He strongly urged the release of approximately two million dollars to complete the installation. The committee will recommend this action to Mr. Haight.

Massena—M-2520—Neoprene Extruding Equipment—\$475,000. Messrs. Coffin, Gilbert, and Knapp discussed this request, pointing out that savings of \$165,000 to \$190,000 annually would be realized by the purchase and installation of this equipment. It will completely eliminate toll fabrication of covered line and service drop wire which is now done by the Rome Cable Corp. Doing the work ourselves is felt necessary in order that we compete with Kaiser which owns U.S. Rubber and Kennecott which now owns Okonite. Mr. Knapp also pointed out that there will be another request for approximately \$130,000 for twisting equipment to come should this request be approved. If this is not approved, the amount will be \$200,000 since renovation of the building for the twisting equipment, now planned under M-2520, would still be necessary.

[fol. 5335] *Vernon*—CDLA-1405—Purchase of Two (2) 9" x 14" Roll Truing Machines—\$33,160. The lack of capacity for roll truing soft alloy extrusions has been giving great difficulty in Vernon's meeting promises. In order to improve this situation and to prepare for acceptance of available additional business, the purchase of these two machines was requested. Savings of \$49,700 will be made

by the elimination of current overtime, and the bottleneck of this operation will be eliminated.

Pittsburgh — P-2475 — Metallurgical Development Expense—1959—\$319,000.

Pittsburgh—P-2487—Purchase N.C.R. Posting Machine—\$4,978.60. This machine is needed in cashier's office for handling Imprest Fund accounts and will save hiring additional help.

Pittsburgh—P-2470—Investigate the Release of Thermal Distortion in Forgings—\$7,500. This will continue experimental work in the release of thermal distortion and forgings of more complicated cross section.

T.I.S. Boak, Jr.

TISB:MFB

Copies to:

Committee Members Present: Messrs. R. W. Andrews, Wm. Boyd, L. H. Crudden, T. O. English, Krome George, C. I. Johnson, J. A. MacLeod, D. C. Mathewson, H. F. Robey, Jr., M. W. Stanley.

Committee Members Absent: Messrs. J. H. Alden, L. P. Favorite, J. S. Harrison, L. B. Kuhns, J. A. Neustaedter.

Guests: Messrs. P. T. Coffin, H. H. Gnuse, C. C. Jones, R. W. Knapp, T. L. Gilbert, Massena.

[fol. 5336] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 158

Internal Correspondence

July 8, 1957.

From: Philip T. Coffin
Pittsburgh Office

To: Mr. R. V. Davies
Pittsburgh Office

Confidential

Re: Rome Cable Corporation

Here are a few thoughts and figures which may be helpful to you in discussing the possible acquisition of Rome Cable Corporation by Alcoa.

From almost any standpoint, the move would seem to be advantageous to Alcoa assuming, of course, that the cost was not too high. I can see the possibility, if not the probability, of some difficulties with respect to the handling of managerial personnel problems in both the Alcoa and Rome organizations, but I think that if the general matter of personnel is given careful consideration and percipient moves are made that everything should work out smoothly.

From other viewpoints I fail to uncover any angles that could not be taken rather easily in our stride. It seems to me that assuming that the physical plant could be acquired at a reasonable figure, by far the biggest other asset would be the acquisition of experienced personnel in that particular field of endeavor. Rudy Schatzel, of course, is considered to be one of the top men in the industry; and he has a number of younger men reporting to him who should be quite capable of carrying on after Rudy's retirement. In both operating and research, Rome happens to have very capable key men. So far as Rome's Sales Department is concerned, I think that we would have to give that particularly careful thought inasmuch as their method of distribution and direct selling differs considerably from ours.

[fol. 5337] Another very large asset which we would acquire would be that of almost complete participation in the

insulated conductor field in either aluminum or copper. In many cases, the so-called package deal is of extreme importance; and in many other cases, the mere prestige of carrying almost everything on the shelf makes a big impression on customers. If my memory serves me right, I think that Ross Fraser made the statement in front of you and me one time that if all wire sizes are included, their card index shows something like 300,000 items for which they have specifications on file. Rome Cable covers the entire field with the exception of the so-called high voltage, power cables which are in excess of 15,000 volts. I think Rome Cable has been smart in making that dividing line, and I think that we would be equally wise not to try to enter the high voltage field.

As I pointed out to you the other day, a study made by Anaconda Wire and Cable in cooperation with Alcoa indicates that at the present time EC aluminum has invaded the EC copper field only to the extent of 25 per cent. Granting that there are a number of fields which will probably remain in the copper camp until such time as copper might become virtually a precious metal, I think it is quite easy to visualize a reversal of the figures wherein aluminum will have invaded the copper field to the extent of some 75 or 80 per cent. I attach a photostat of product classifications taken from the Rome Cable catalog wherein the products have been check marked as to whether or not they would appear to be reasonable uses for aluminum. There are a number of uses such as magnet wire, the larger sizes of building wire, welding cable, power cable, etc., which I think could be spurred on at a much accelerated pace if we and the Rome people were working hand in hand. So far as covered conductors are concerned, I attach to this letter a chart showing [fol. 5338] our progress since we entered the field. You will note that despite the set back in 1956 and 1957, which is chiefly attributed to lack of housing starts and a temporary retrenchment on the part of the utilities in distribution expenditures, the Alcoa trend is still upward. I have gathered from a few remarks here and there on the part of the Rome people that their volume is probably about the same as Alcoa's in aluminum covered conductors. It could be anticipated, therefore, that with the acquisition of the Rome Cable Plant our monthly shipment of aluminum covered

conductors and triplex would probably at least double and with a very satisfactory profit margin which would no longer have to be shared in part as a result of the acquisition.

Rome Cable's activities in steel conduit and their recent acquisition of the Cope Company would undoubtedly give us some additional outlets for Alcoa aluminum, but at the moment I have no way of evaluating those outlets.

From the standpoint of the Rome Cable stockholders, it seems to me that with the increasingly vicious competition which is found in the electrical conductor field the Rome stockholders would be far more secure if they were part of the Alcoa Organization. Just this past week Ross Fraser, as I explained to you, was certainly given an opportunity to see just how far the present price cutting campaign had gone; and at the moment there seems to be little relief in sight. Even granting the beautiful earning record of Rome Cable Corporation, it seems to me that those earnings would be very seriously jeopardized if Rome, due to the heavy competition in electrical conductors, would have to drop out of the picture and be content to deal only in copper. It appears at the moment that they may be exactly what some of the independent conductor people will have to do.

Philip T. Coffin.

PTC:ags

[fol. 5339]

Product List

Today, Rome Cable offers to the purchaser of electrical wires and cables a well-rounded line of bare and insulated copper and aluminum conductors in sufficient variety of constructions to service adequately the requirements of practically any installation involving the transmission of electrical energy, both low and high voltage. Listed below are product types regularly manufactured. Our Engineering and Research Departments are ever ready, however, to study any special problem to the end of creating such cable design as will best serve your requirements.

Bare and Tinned Wires and Cables

Solid and Stranded (Copper and Aluminum), Round, Square, and Rectangular, ACSR

**Weatherproof Wire and Cable
Copper and Aluminum**

Braided-Type URC, RoLene (Polyethylene) Covered, RoPrene (Neoprene) Covered, Tree Wires

Magnet Wire

Cotton, Paper, Asbestos, Glass Covered.

Building Wires and Cables

Rubber and Braided, Rubber and Lead Covered, Rome Synthinol* Thermoplastic Insulated, RoFlex Nonmetallic Sheathed, FlexAll* Thermoplastic Nonmetallic Sheathed.

Conduits

Rome—EMT, Rome—Rigid.

Radio and Instrument Wire

Rome Hi-Temp Rubber Insulated, Rome Synthinol*, Thermoplastic Insulated, Army-Navy Specification Types, RoTran Radio Frequency Transmission Lines, Balanced or Coaxial, Microphone Cables, Television Camera Cable.

*T. M. Reg.

Signal and Supervisory Cables

Flexible Cords

Rubber Insulated, Rome Synthinol* Thermoplastic Insulated.

Machine Tool and Control Wires

Rome Synthinol* Thermoplastic Insulated.

Heavy-Duty Cords

Rubber Sheathed, Rome 60* Neoprene Sheathed, Rome Synthinol* Thermoplastic Sheathed.

Heavy-Duty Portable Cables

Rome 60* Neoprene Sheathed, Mining, Welding, Power (Types W and G), Shovel Power—Type SH, Diesel Electric Locomotive Cable.

Power and Control Cables

RoPrene (Neoprene) Sheathed, RoSeal (Thermoplastic) Sheathed, Rubber Insulated and Lead Covered, Rome Synthinol* Thermoplastic Insulated, RoLene (Polyethylene) Insulated, RoMarine-RoPrene Low-voltage Distribution, RoZone* Insulated High-voltage Distribution, RoZone A Insulated High-voltage Distribution, Series Street Lighting, Self-supporting Aerial.

Service Drop and Service Entrance Cables—Copper and Aluminum.

Specify Rome Cable . . . It Is Your Assurance of Dependable Quality.

[fol. 5340] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 159

Mr. R. V. Davies

July 11, 1957.

F. L. Magee
Pittsburgh Office

Mr. I. W. Wilson
Pittsburgh Office

Confidential

Re: Rome Wire and Cable Company

Ralph Davies and I were at Rome yesterday and met with Messrs. H. T. Dyett and J. H. Dyett and A. D. R. Fraser. We had lunch with the following officers, who are also members of their Board of Directors:

H. W. Barnard
H. T. Dyett
J. H. Dyett
C. H. Ellis
A. D. R. Fraser
G. E. Rolston
R. A. Schatzel
F. S. Marks

Most of the talking on Rome's side was done by Mr. H. T. Dyett and Mr. Fraser. The atmosphere was most friendly all the time.

The reasons for any possible interest we might have in the Rome Wire and Cable Company were discussed in some detail. This was rather important because it laid the ground work for a further discussion and impressed on them the importance of Alcoa's further development in the insulated aluminum wire and cable business.

Mr. Dyett described the development of the Rome Wire and Cable Company and his anxiety to maintain the fine organization for which he felt responsibility. As you know, he took with him a number of important people from the General Cable Company when he formed the Rome Com-

[fol. 5341] pany. Mr. Davies and I described as best we could how we believe his organization and facilities could best be operated on a divisional status if a merger should be consummated. We pointed out that many details would have to be covered in the event of further discussions, but that, generally speaking, we felt the production and marketing of various types of aluminum and copper electrical conductors might best be handled on a divisional basis with, of course, the natural coordination that would be necessary with respect to policies and practices of the parent company. We pointed out that only experience could develop the best working arrangement. For example; it seemed quite logical that as time went on our electrical conductor marketing organization might best be combined with that of the Rome Division, even though Alcoa's present Fabricating Division might well continue to be the production unit for our present products or even some added electrical conductor products. We did emphasize that there was every evidence that the Rome organization and its experience could be fully utilized in the event of a merger. This type of approach to the problem seemed to be acceptable to Mr. Dyett.

There ensued considerable discussion about the present competitive situation on both aluminum and copper electrical conductors, and there was evidence that the Rome people recognized the growing importance of integration of metal production and electrical conductor fabrication. Tax considerations of divisional operations as against subsidiary companies seemed also to be thoroughly understood. They have the same problem with two small diversified divisions.

The recent DuPont decision was raised and Mr. Davies gave them Mr. Hickman's latest opinion. They emphasized this by pointing out that their business in bare A.C.S.R. was of a very minor nature.

Mr. Dyett suggested that, without getting into details, he would be curious to know whether we had discussed methods of accomplishing a merger. We said that we had discussed the matter only with you and again in generalities, and one of the ideas we had discussed was an exchange of stock. He and Mr. Fraser then indicated that if we felt we needed information additional to that in their annual

statement and in their SEC reports, they would be glad to give us whatever we asked for. However, they indicated that they believed there was sufficient in these reports for us to come to our own conclusions as to what we might wish to put as a value on their company. It was pretty obvious to Ralph and me that they were building a pretty good case for a substantially higher figure than would be indicated by the book value. For example, Mr. Dyett pointed out that some years back, when Bill Price tried to buy their company, the offer was so ridiculously low that about all he could do was fold up his papers and bid them a pleasant goodbye. They both pointed out, however, that Westinghouse and Rome have been very close friends through all the years. In any event, we got very little of any definite nature as to what they might consider as an acceptable valuation.

Finally, Mr. Dyett said he would like to give the matter further consideration and hoped that we would return to Pittsburgh and do the same. He said that in the course of a few days he would phone Ralph and let him know whether or not they were at all interested in a further discussion on the subject.

Ralph's and my conclusions are that Mr. Dyett is definitely interested, but at terms and conditions that might [fol. 5343] be pretty difficult for us to swallow.

F. L. Magee.

FLM:RAH

Cc—Mr. R. V. Davies.

[fol. 5344] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 161

August 14, 1957.

P. T. Coffin
Pittsburgh Office

Mr. W. K. Unverzagt
Pittsburgh Office

Legal

Re: Rome Cable Corporation

Please consider this letter as a partial reply to your letter of August 9 having to do with the legality of Alcoa's possible acquisition of Rome Cable Corporation. Mr. F. L. Magee had written me more briefly on the same subject on August 6. Accordingly, I am sending copies of this letter to both Mr. Magee and Mr. Davies, and also to Mr. Wilmot.

I hope to have considerably more information on your numbered paragraphs 1, 4, 5 and 7 by Friday the 16th. That additional information is being gathered for me by Rome Cable Corporation.

In order to meet your deadline of August 14, I have already gathered the following information in answer to your nine numbered paragraphs. The numbered quotations are yours.

1. "I assume Rome purchases pig from Alcoa. If so, what is the dollar amount of such purchases? If it purchases from others, what percentage of Rome's requirements does Alcoa supply?"

Rome purchases EC pig from Alcoa as well as from others. The dollar value purchased from Alcoa was approximately \$1,096,000 in 1956 and \$233,000 to date in 1957. The salesman handling the account believes that Alcoa receives about two-thirds of Rome's EC pig purchases. It is believed that the balance is divided between Kaiser and Alcan. Rome gave all its pig business to Alcoa from about 1953 to 1956, but commenced dividing the business at Alcoa's suggestion when a severe metal shortage began to develop.

[fol. 5345] 2. "If we sell Rome any other materials such as redraw rod, wire, etc., what is the approximate dollar value of those sales, and what percentage of Rome's total requirements for such products does Alcoa supply?"

Rome purchases a very small miscellany of Alcoa products other than pig. In 1956 the aggregate value of purchases of such products—EC wire, bare cable, covered conductors, cable accessories, foil and chemical products was less than \$3,000.00. In 1957 to date it is less than \$1500.00. It is believed that Rome purchases virtually all such requirements from Alcoa.

3. "List the products which Rome sells and indicate those which Alcoa also sells."

The following summary of Rome's products is copied from Dun and Bradstreet's July 3, 1957 report. The individual items of course run into the thousands. The products underlined are also sold by Alcoa:

Copper: Manufactures rolled rods, bare and tinned wires and cables, magnet wire, weatherproof wire and cables, rubber insulated building wire, rubber insulated flexible cords, neoprene sheathed heavy duty rods and cables, control cables, low voltage power cables, high voltage power cables, service drop and service entrance cables, miscellaneous rubber insulated wire and cables, thermoplastic insulated building wire, thermoplastic insulated flexible cords and thermoplastic insulated instrument and radio wire (S C 3392-3631). Aluminum: *Rolled rods, bare wire and cables, magnet wire, weatherproof wires and cables, insulated power cables, and self-supporting service drop cables.* (SIC 3352-3392).

Steel: Electrical metallic tubing, rigid conduit, conduit [fol. 5346] fittings, television mast tubing and commercial tubing (Sic 3611). Under new T.S. Cope Division, manufactures cable trays, racks and troughs and accessories for the installation of cable. Direct defense contracts are small. Many of the products manufactured are used in defense industries, either directly or indirectly.

Although you do not ask the question, it is perhaps of importance to bear in mind that Alcoa manufactures most of the weatherproof wire and cable as well as service drop

in thermoplastic coverings, only. It sells, however, rubber and synthetic rubber coverings applied to its bare wires and cables by Rome on a toll basis. Up to less than a year ago Rome also applied the thermoplastic coverings for Alcoa.

4. "Give as well as you can Rome's percentage of the market in each product which it sells, and to the extent that Alcoa sells the same products show Alcoa's percentage of the market."

I have no really constructive reply to this question at the moment. I have the impression that Rome is probably an overall factor of perhaps ten percent in its overall field of endeavor. It enjoys an excellent reputation and in some products is doubtless a much larger factor. It limits its field in high voltage cable (very wisely, I think) to not over 15,000 volts.

In the area where Rome and Alcoa are competitive, I must again resort to considerable guesswork. So far as aluminum weatherproof (covered) conductors and service drop are concerned, the BDSA (Department of Commerce) figures indicate that Alcoa is about a ten percent factor. My guess is that Rome is a smaller factor than Alcoa in this field—say 5 to 7½ percent. Alcoa is currently about a one-third factor in bare conductors. Up to the present [fol. 5347] Rome has only occasionally shown itself in this field and can hardly be considered a factor.

5. "Describe the method by which Rome distributes its product. If it sells through distributors or jobbers, do any of them also handle Alcoa's products or the products of any other manufacturers?"

I do not have much concrete information on Rome's selling outlets. We do know that they have some thirty-five to forty salesmen—about the same number as Alcoa has on conductors—and that they have fifteen sales offices and six warehouses located at:

Sales Offices

Atlanta, Ga.
Boston, Mass.
Chicago, Ill.
Cleveland, Ohio
Dallas, Tex.
Detroit, Mich.
Houston, Tex.
Los Angeles, Calif.

New York City, N. Y.
Philadelphia, Pa.
Pittsburgh, Pa.
Salt Lake City, Utah
San Francisco, Calif.
Seattle, Wash.
Torrance, Calif.

Warehouses

Chicago, Ill.
Dallas, Tex.
Los Angeles, Calif.
San Francisco, Calif.
Seattle, Wash.
Torrance, Calif.

We know that they have quite a number of distributors, but I shall have to await further particulars.

6. "How many companies are engaged in selling the products which are sold by Rome at the same distribution level at which Rome sells?"

I understand this question to inquire, in effect, how many manufacturing competitors Rome may have. The answer [fol. 5348] will vary a great deal, depending on the product. For many of the copper products such as building wire, lamp or appliance cords, and many other products sold across the counter, the number of manufacturers might well be 50 to 100 or more. Probably not over one out of ten of these dabble in aluminum. Manufacturers of covered or weatherproof wire and cable, and service drops probably number about 35 to 40, and most of them dabble in aluminum, and certainly about 15 of them are very competitive factors. Of these, Kaiser is the biggest. About twelve companies regularly compete in the bare aluminum conductor field, and another eight or ten who do not handle aluminum compete with Rome in bare copper products, such as trolley wire, rail bond cable, etc.

7. "What has been the history within approximately the last five years of any mergers or acquisitions of one company by another in this industry?"

I do not have much information as yet on this question other than what I remember. My recollection is that probably a dozen mergers or acquisitions have taken place during the 1950-1957 period. The Kaiser-U.S. Rubber deal and the Olin-Mathieson-Southern Electric combination seem to have been the most "industry rocking" announcements, and certainly the most threatening to Alcoa's position.

8. "Would the acquisition of Rome aid Alcoa in competition with other cable producers?"

My answer to this question is a most emphatic "Yes". Alcoa, through many years of experience in the bare conductor field, long since became and continues to be a leading factor in aluminum. Until rather recently its competition—domestically at least—was almost entirely with bare copper conductors. In the last decade Alcoa's

bare conductor competition has changed almost entirely to aluminum. This phenomenon in itself was not unexpected, but it introduced a new competitive phase which can well put Alcoa "on the ropes" in the broad electrical conductor field unless prompt steps are taken to head off the threat. The steps in cause and effect are quite simple:

A. As the spread between copper and aluminum prices became more and more favorable to aluminum one copper conductor manufacturer after another assumed the dual role of a producer of either class of product.

B. Copper had been the accepted standard since the birth of the electrical industry for all electric conductor purposes, and until the era of definite aluminum price superiority arrived never was seriously challenged in the many fields of electric conductors other than bare transmission.

C. Copper conductor manufacturers with the "know how" in the fields of manufacture, research, technology, competitive tricks or gimmicks and distribution, introduced aluminum into new areas of electric conductors—covered or weatherproof conductors, power cables, welding cables, etc. They and the aluminum people are probing in many other areas.

D. The "dual rolers" are in a most strategic position to exploit existing copper uses for aluminum, and to take advantage of that great gimmick known as the "package deal", wherein a customer requiring certain aluminum as well as copper requirements is given a bargain by placing orders for both at the same time.

E. The "package deal" and the possession of "know [fol. 5350] how" have already lead two integrated aluminum producers to acquire "dual rolers"; Kaiser bought out the conductor division of U.S. Rubber, and Olin-Mathieson bought out Southern Electrical Corporation. Rumors have been rife for months that Reynolds is looking around for a similar buy. Anaconda Wire and Cable is now, of course, in every practical sense, a double integrated "dual roler".

F. Rome Cable, with its fine personal and in general excellent "know-how", is by far the best acquisition, in my opinion, that Alcoa could hope to find. The step would be the answer to the present Kaiser threat to push Alcoa out of first place in the electrical conductor field. Kaiser re-

cently took Baltimore Gas and Electric Company's 1958 requirements through the medium of an aluminum-copper "package".

9. "If Rome is engaged in the manufacture and sale of products which Alcoa does not manufacture and sell, what problems would Alcoa encounter in getting into that business if it did not acquire Rome?"

The answer to this question, I believe, is largely reflected in my effort to reply to #8. Instead of acquiring a going concern in every sense of the word—plant, personnel, goodwill and "know-how"—all in one move, Alcoa would be faced with attempting to pick up all kinds of information and technical "know-how" in particular. A large part of the physical plant and equipment would take at least two years to complete, and I question very seriously whether Alcoa could acquire piecemeal "know-how" to be fully competitive within less than five to ten years; even this statement may be conservative, for certainly our competitors would not be standing still while we were trying to catch up. It may be just a simple matter of whether or not we decide that the present opportunity is too risky—financially, legally, or both. From what we can gather statistically, it appears that aluminum today has invaded electric current carrying uses of copper to the extent of about 25%. I believe that aluminum has at least another 50% natural invasion to exploit.

P. T. Coffin.

cc: Messrs. F. L. Magee, R. V. Davies, D. Wilmot.

[fol. 5352] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 162

Mr. R. V. Davies, PGH

August 16, 1957.

F. T. Coffin,
Pittsburgh Office.
Mr. F. L. Magee,
Pittsburgh Office.

Re: Rome Cable Corporation

I think that most of the material you would like to have in mind when you discuss the Rome Cable Corporation matter with Messrs. Wilson, Davies, and Hickman will have been contained in my letter to Mr. Unverzagt. However, a few other aspects are certainly of importance; and one of them was touched upon in passing in a luncheon conversation I had in Pawtucket, Rhode Island, yesterday. The acquisition by any of the integrated producers of any of the independent wire and cable companies or various combinations of mergers are not nearly as obnoxious to the people who are already active in the wire and cable industry as is the entrance of a newcomer with bright, shiny new equipment. Acquisitions and mergers have the common denominator of not adding to existing capacity in the industry, and everybody in the industry is very conscious of the fact that the entire industry would be much more healthy if each manufacturer were to toss about two-thirds of his equipment into the Atlantic Ocean. Yesterday I had lunch with some of our people and some of the Leviton Manufacturing people including the young Ben Leviton, whom I believe is now Executive Vice-President. Right out of a clear sky Ben asked me if I was aware of the fact that Reynolds Metals was trying to get hold of a wire and cable company. I told him that I had heard the rumor and was not particularly surprised to hear that he had heard it. He then made the statement that he guessed there was no way to keep Reynolds from expanding the way Kaiser did but that it at least would not make the picture any worse from the standpoint of additional fabricating capacity.

Another point that perhaps I should have stressed in my letter to Bill Unverzagt is the fact that in acquiring a company like Rome Cable another important part of the "know-how" is the contact that exists between that company [fol. 5353] and all of its customers. For example, no matter how good we may think our electrical conductor boys are as salesmen, we could not expect them generally speaking to invade fields like magnet wire, building wire, etc. and compete on an even basis with salesmen who have been acquainted with those particular groups for many years; and, of course, as a corollary to this statement, it is self-evident that we would not have enough electrical conductor salesmen to cover all these bases, if we started from scratch, without probably at least doubling their number.

One more good commercial reason for our wanting to acquire Rome is the fact that the Cope Division is a manufacturer of cable racks, and I think it is almost inevitable that a good portion of that business can be swung over to aluminum. I notice that Rome's annual report intimates the same thing. This one factor, of course, would not be anywhere near justification for the acquisition in itself, but it is an additional factor to be considered.

P. T. Coffin.

PTClelj

CC: Mr. R. V. Davies, Pittsburgh.

[fol. 5354] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 163

Internal Correspondence

September 20, 1957.

From: T. H. Kerry,
Accounting Department,
Pittsburgh Office.
To: Mr. S. T. Gustina,
Pittsburgh Office.

Re: Rome Cable Corporation

Attached is a schedule showing weight and revenue, by major product, of our sales to Rome Cable Corporation since 1952. You will note the change in pattern of business over this period, from wire and cable to redraw rod and subsequently to almost exclusive sale of pig. I believe this is due to the conversion of their wire-drawing machines and stranders from copper to aluminum, and subsequently the installation of Properzi units, so that they are now completely equipped to fabricate cable from pig.

Since 1955, practically all of these sales have been pig, and we believe it is safe to assume that sales in the future would be confined to pig. Therefore, we have completed the estimated margin on pig sales only for the last three years. The margin shown is based on bone cost excluding G.A. & S.E., and currently averaging a little over 11¢ per pound. Therefore, if sales in future years to Rome Cable should average 4,000,000 pounds annually, the total margin accruing to Alcoa from this source would amount to about \$450,000 annually.

Rome Cable currently toll converts all of Alcoa's requirements for Neoprene covered cable and certain odd sizes of Polyethylene covered cable. This is probably a temporary arrangement since we plan to install Neoprene covering facilities sometime in the future. It is significant [fol. 5355] to the present problem to note that, if Alcoa were to acquire Rome Cable's assets, it would not be necessary for Alcoa to make a future capital expenditure for installing Neoprene covering facilities. Conversely, if Rome

Cable's assets were purchased by some other corporation, it might become necessary for us to make the capital expenditure in Neoprene covering facilities at an earlier date than is now contemplated.

T. H. Kerry.

THK:SPC
Attachment

[fol. 5356]

	Product	Weight	Revenue	Cost Excluding G.A. & S.E.	Margin. Per Amount Pound
1952					
	Pig.....				
	Alloy Wire.....	54,128	15,636		
	EC Wire.....	125,120	36,360		
	Cable.....	416,425	152,046		
	Foil.....	614	339		
1953					
	Pig.....	1,218,135	242,204		
	Alloy Wire.....	55	64		
	EC Wire.....	84,520	29,111		
	Cable.....	604,466	226,874		
	Rod and Bar.....	100,423	26,310		
1954					
	Pig.....	1,581,233	320,622		
	Alloy Wire.....	108	108		
	EC Wire.....	11,648	5,079		
	Cable.....	5,211	4,353		
	Foil.....	1,977	1,291		
	Rod and Bar.....	514,710	136,072		
1955					
	Pig.....	3,174,620	691,553	444,764	246,789 .078
	Alloy Wire.....	284	264		
	EC Wire.....	810	240		
	Cable.....	8,174	3,452		
1956					
	Pig.....	4,526,290	1,096,410	658,123	438,287 .097
	EC Wire.....	1,172	420		
	Cable.....	2,112	1,275		
1957 (Jan.-July incl.)					
	Pig.....	1,114,816	284,277	158,750	125,527 .113
	Cable.....	855	532		

[fol. 5357] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 164

September 26, 1957.

T. H. Kerry,
Accounting Department,
Pittsburgh Office.
Mr. S. T. Gustina,
Pittsburgh Office.

Confidential

Memorandum

Re: Rome Cable Corporation

A meeting was held in Mr. Hickman's office at 2:00 P.M. today to discuss the Rome Cable negotiations. I attended this meeting in view of the absence of both you and Norm. Mr. Hickman stated that at the meeting which he and Mr. Davies held with these people, they offered \$22,500,000, which would amount to 308,000 shares of Alcoa common stock at current market. This was firmly rejected. Nothing specific was given as to Rome's asking price, although Mr. Hickman gathered they were thinking in terms of three-quarters of a share of Alcoa stock for one Rome share, which would amount to \$31,000,000. Mr. Diet apparently is interested only in stock transfer and not in debenture, although the idea of convertible debentures was apparently a new thought to them.

Another meeting in Rome will be held next Tuesday, which will apparently be decisive. In preparation for this meeting, Mr. Hickman requested the calculation of the effect to Alcoa of an offer of \$25,000,000 and of \$24,000,000. There is apparently some feeling that Rome might be receptive to such an offer. He also requested that we compute the amount which we could afford to offer in terms of debentures, which would leave us in the same net position after taxes as a stock offer of \$24,000,000.

[fol. 5358] Matt Stanley will prepare tables showing relative stock values based on past and present market values. A member of the Legal Department will prepare a draft of an agreement of sale. Keith Poudner will prepare tables

showing the economics of a \$24,000,000 or \$25,000,000 price in terms of stock and debentures.

I am determining the manner in which such a transaction would be shown on our balance sheet, assuming payment in terms of stock at current market value. I will also attempt to develop arguments pointing up the advantages and favorable position to Rome of accepting sale at the proposed prices.

A meeting will be held at 11:00 A.M. Monday in Mr. Hickman's library to present the foregoing data.

T. H. Kerry.

THK:SPC

[fol. 5359] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 165

October 2, 1957.

Mr. John L. Loeb,
Claridge's Hotel,
London, England.

My dear John:

Our visitors from a certain aluminum company were here yesterday and after several hours of conference they made their offer in common stock only. The offer, in our unanimous judgment, was one that neither our Directors or stockholders would have approved. We, therefore unanimously rejected this offer and expressed our high opinion of their company and our desire to continue cooperation with them in any way possible in the future.

There are certain reasons why they felt the offer as liberal as they can make. Under all circumstances I feel confident you would agree with me. They and we both hope to keep this matter out of the papers and, therefore, are seeking to keep the information contained here in confidence. For your own private information, I am advising their offer was for \$24,000,000 of their common stock, which at \$75 a share figures out 320,000 shares. These shares pay dividends of \$1.20 per annum. I trust that this may be

held in confidence within our group and I sincerely trust you approve of our action.

One of the strong reasons that led us to promptly reject the offer was the dividends that they are paying and the earnings that our company anticipates making so soon as present unsettled price conditions return to something more nearly approaching normal. We figure that with our new equipment and rearrangement in Rome, with very nice earnings coming out of our Cope Division in Collegeville, Pa. and a much improved outlook in California, that our company should hit earnings of \$3,000,000 per annum without any difficulty.

I trust that you and Peter are having an interesting, delightful time and trust I will be able to get a glimpse of you sometime late in October.

Very warm regards.

Cordially, —, —,

HTD:AS
Air Mail

[fol. 5360] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 166

Internal Correspondence

October 14, 1957.

From: R. V. Davis,
Pittsburgh Office.
To: Mr. F. L. Magee,
Pittsburgh Office.

I am attaching a memorandum dated October 14 by Mr. Coffin captioned "Acquisition of Insulating and Covering Facilities", as well as considerable covering data. You may not want to wade through all of this but it is interesting that all of the four companies referred to seem to do quite well financially.

There are rumors, unsubstantiated, that Reynolds is shopping around for a company of this type. I believe that we should take some action as promptly as possible,

but at least as far as Phil and I know none of us have personal contacts with any of these firms such as was the case with Rome.

It also seems to me that it would be bad if word circulated that Alcoa was shopping around and I wonder, therefore, if we could not do some shopping through a third party who would not reveal the name of his principal unless and until a real interest was evidenced. I believe there are firms who make a business of doing this kind of work although I do not know who they are. Certainly our financial contacts should have some knowledge as to how this is done or recommendations to make.

I would like to discuss this with you at your convenience.

R. V. Davies.

Present stock price.

RVD

Whenever you say—leaving for NY now. Hope return Thurs.

F.L.M. 10/15

P.S.

How about Kerite?

[fol. 5361] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 167

Internal Correspondence

Oct. 15, 1957.

From: F. L. Magee,
Pittsburgh Office.

To: Mr. R. V. Davies,
Pittsburgh Office.

Re: Ronie Cable Corporation

Ross Fraser was visiting his son (perhaps it was a daughter) in Pittsburgh over last weekend and called me on the phone to express to me the same thoughts that he did to you and Lee; namely, that he hoped the breakdown in our negotiations would not result in any change in the hereto-

fore prior good relationships. He said he had talked to you a day or two before on the phone and consequently he wanted to chat with me also.

I told him we were naturally disappointed and found it a little hard to understand why our proposition was not a perfectly good one from their standpoint, considering the basic and intrinsic values incorporated in our system. He replied quite carefully with a measured comment that he and some others did realize the future potentialities of Alcoa and its underlying common stock, but inferred that Mr. Dyett was not sold on the proposition and indicated that he was concerned about the income angle. I pointed out that the convertible proposal took care of this, but he simply reiterated, in more or less veiled terms, that it was the Dyetts who really were the hold-outs. Unfortunately, he gave no indication or suggestion as to re-opening or continuing the negotiations.

F. L. Magee.

FLM:RAH

Cc—Mr. L. E. Hickman.

[fol. 5362] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 168

Internal Correspondence

Oct. 3, 1958.

From: F. L. Magee,

Pittsburgh Office.

To: Mr. R. V. Davies,

Pittsburgh Office.

Re: Ebasco Services, Inc.

The discouraging angle of your letter of September 23rd points to the strong possibility that we are nearing the end of our rope on the acquisition program. If the Okonite proposition does not work out, it seems to me we are in the position of where we might want to make one more pass at Triangle and possibly the smaller company in Trenton (name slips my mind at the moment), neither of which, as I

understand the situation, has any great promise of success.

Meantime, don't you think that it is highly important that Phil Coffin, along with our Operating and Engineering group, put some real concentrated effort on the development of an alternate program on which we should proceed promptly, if we fail in these instances? I am sure you will agree that no time should be lost getting into our own program, if we fail in the acquisition program.

There is some merit in developing our own program, because even if we have additional negotiations, we will be in a much better position to evaluate whatever offer we might want to make outside, if we have a better understanding as to just what is called for in our own program in the way of facilities, capital expenditures and potential costs. I am, of course, referring to a rounded out program well beyond the neoprene stage, and a program which Mr. Coffin and his associates would recommend to keep us in the No. 1 spot in the aluminum conductor field and, if necessary, a sufficient factor in the copper field to help us maintain the No. 1 position in the aluminum field.

[fol. 5363] I know that we have made the neoprene study, but I am not sure that management has really had a visualization of the whole program ahead of us as our electrical conductor people would visualize. I point out that with this whole picture before us, our offer for a good company might be substantially influenced.

Regardless of the foregoing program, I return to my original point; namely, that the company should really know what we are headed into if we are going on our own and, to my knowledge, this picture has never been developed, as I understand Mr. Coffin's position with regard to our comparatively short range needs to meet the competitive situation.

F. L. Magee.

FLM:RAH

Cc—Mr. P. T. Coffin, Mr. H. C. Erskine.

[fol. 5364] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 169

October 16, 1958.

File Routed To:
F. L. Magee,
Pittsburgh Office.

Re: Ebasco Services, Inc.

Yesterday, upon reading that Kennecott had taken over Okonite, I talked with Phil Coffin. He confirmed my understanding that his next choice to Okonite would be Triangle—his final choice Crescent, and failing in either one of these instances, then we should move as fast as we could under our own steam, as suggested in my letter of October 3rd to Ralph Davies.

I phoned the above information to Mr. Davies, who planned to talk with Mr. I. W. Wilson and if he has no feelings to the contrary, put Ebasco in motion with Triangle as promptly as possible.

F. L. Magee.

FLM:RAH

[fol. 5365] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 170

This Copy for: Mr. H. C. Erskine—Pittsburgh Office

November 21, 1958.

T. L. Gilbert—Massena Wks.
R. W. Knapp—Pgh. Office.
Mr. E. D. Mairs,
Pittsburgh Office.

Re: Preliminary Report Covered & Insulated Wire & Cable

Since our meeting with Mr. H. C. Erskine on November 12, the following progress has been made.

It has been established that Step I, for immediate consideration, should include the following:

Step I—Immediate consideration—

A. Neoprene Line & Auxiliaries—R/A M-2520 Capacity 3,000,000# A1. wt./yr.	\$475,000
B. Buncher for Development—Revision to Auth. M-31998 —Additional Funds	1,500
C. Twister and Rewind Line (Guesstimate) Capacity 4,000,000# A1. wt./yr.	110,000*
D. Metal Strip Wrapping Equipment (Guesstimate)	15,000
Total of Estimates	\$601,500

* Item A includes sufficient funds for building to include all of Step I.

Should item C be desired before item A, an additional amount estimated at \$40,000 would be required to provide suitable building facilities for this equipment. Then item "A" could be reduced by \$40,000.

Parts C & D will be included in requests for authorization as soon as engineering and economics are completed. [fol. 5366] As far as the next steps are concerned, they become somewhat intangible and their order cannot be established at this time. However, the following programs should be considered in the final report which should be completed early in January, 1959.

1. Facilities to produce power cable and building wire at Massena.
2. Additional polyethylene and neoprene production facilities for covered conductor at—
 - (a) Massena or
 - (b) Vancouver or
 - (c) Other location
3. Facilities to produce at Massena:
 - (a) Armored cables
 - (b) Flexible cords and cables
 - (c) Radio hook-up wire
 - (d) Telephone wires and cables
4. Investigate need for specialized technical personnel.

T. L. Gilbert, R. W. Knapp.

TLG:RWK/es

cc: Mr. N. B. Lane—Massena Works, Mr. H. C. Erskine—Pittsburgh Office, Mr. P. T. Coffin—Pittsburgh Office.

[fol. 5367] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 171

December-2, 1958.

From: T. L. Gilbert.

To: Mr. N. B. Lane.

Re: Covered Conductor—Overall Program

Following are pertinent points developed during my recent Pittsburgh trip:

1. *Neoprene Line*—Joe Healy was working up the profit picture at both a. scheduled prices and b. current depressed prices. Generally speaking, the equipment would decrease our margin loss on neoprene products from \$326,000 to \$76,000 per year. We have recommended going ahead with project if Alcoa expects to remain in the Covered Conductor Business.

2. *Twister and Rewind Lines*—L. T. Guess has furnished a sales forecast which indicates the need for additional twisting capacity by next fall, or possibly sooner. Additional rewinding capacity would also be required to handle the greater number (same proportion) of expected tank test rejects. Massena was instructed to proceed with necessary R/A for these lines. It should be available for forwarding to Pittsburgh by December 5. Done.

3. *P. T. Coffin's Overall Insulated Conductor Forecast*—Over \$500 million per year is present volume of all insulated wire and cable produced domestically, with copper being a 98% factor. Much of this can be replaced economically with aluminum.

The present Kennecot-Kaiser-Okonite-U. S. Rubber combine presents Alcoa with a very formidable opponent. However, fact that Kennecot owns 16% or more of Kaiser should soon have a stabilizing effect on Kaiser's pricing policies.

Insulated Conductor business was historically a profitable one until Kaiser upset the cart. It should return to this attractive profit level soon. Right now we are in an unparalleled price slump.

Mr. Coffin feels that Alcoa must become competitive in

the overall insulated field, including production of copper wires and cables!

[fol. 5368] 4. *P. T. Coffin's Immediate Concerns*—Since we have limited equipment for insulating, we are in a vulnerable spot. Two years ago we lost several good customers due to inability to deliver when required. These customers are still lost to us. Competitors talk Alcoa down as having insufficient facilities to meet demands. We must not let business get away due to lack of facilities. It is very necessary that we meet our delivery schedules, which means that all material scheduled in a month must be shipped out that month, even if we have to make more use of Rome Cable facilities.

Warehouse stocks have been insufficient for recent high level of business with result that business has been lost. Warehouse authorizations to be increased to reflect present and expected future levels. This will be done by Pittsburgh and Massena Planning. Massena should be able to use the forthcoming expected "seasonal lull" to build up the necessary stocks.

5. *Insulated Conductor Survey*—Following Task Force appointed to make survey: Messrs. E. D. Mairs, Chairman, R. W. Knapp, L. T. Guess, J. L. Healy, Ray Andrews, Massena Engineering and T. L. Gilbert.

To make full report in early January on following:

- a. Determine product mix and volume to be manufactured.
- b. Chronological program for entrance into various insulated categories.
- c. Types and amount of equipment required.
- d. Location of operations, including survey of existing company buildings.
- e. Specialized technical help required.
- f. Total investment required and schedule of expenditure.

With this overall picture in mind, my schedule for the time up to about December 12 is:

1. Hold meeting to brief all Massena people concerned on the overall problem. (done)
- [fol. 5369] 2. Have Engineering prepare R/A for second

twister and rewind lines. (Expect to have complete by December 5)

3. Push L. T. Guess for triplex forecast so that R/A story can be prepared. (Received November 26)

4. Work up insulated conductor product mix and volume. (Local Purchasing obtaining necessary competitor's price schedule and product data. Should receive today. Also, Guess to furnish me with a special report prepared by Alcoa's electrical consultants in New York.)

5. Preliminary investigations on equipment for power cables and building wire. (Press of above R/A has prevented getting into this.)

6. Join with L. T. Guess in scouting for likely future technical help in the group of insulated conductor people at the annual Wire and Cable Symposium at Asbury Park this week.

7. Tentative trip to Pittsburgh next week to check progress and get needed information.

Although early January Leaves only a short time, it is questionable how accurate a survey will result.

T. L. Gilbert.

TLG:jom

{fol. 5370] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 172

December 22, 1958.

T. L. Gilbert
Massena Works
Mr. E. D. Mairs
Pittsburgh Office

Re: Interim Report—Covered and Insulated Wire and Cable

Since the preliminary report of November 21, the following progress has been made:

1. R/A submitted for twister and rewind lines @ \$135,000.
2. Wire and Cable Symposium in Asbury Park, New Jersey, attended by Messrs. Guess and Gilbert, and acquaintances formed with a number of technical people in

insulated wire and cable field for possible future reference.

3. Discussion held with Monsanto Chemical Company at Springfield, Mass. concerning their recent internal market research report on "The Insulated Wire and Cable Industry". Copy of this report is now in our possession on a loan basis. This report has been of major importance in enabling us to proceed with our own analysis.

4. Tentative sales goals set and tentative order of entry into production of various categories determined. See Table I attached.

5. Dollar volume of sales in two major categories (building wire and power cable) that comprise 1/3 of total has been converted to total conductor covering and insulating tonnages. Analysis of communications wire and cable, which also comprise 1/3 of the total field, awaits the imminent acquisition of necessary price sheets.

6. Pittsburgh Electrical Engineering Department is being solicited to work up the degree of usage of various types of cable construction, along with unit weights of component materials in each type.

7. Need for following types of equipment for both aluminum and copper is foreseen:

[fol. 5371] Banbury mixer

Plastic extruders (large and small)

Continuous vulcanizing extruders (small and medium)

Cablers

Bunchers

Rewind and repair lines

Wire serving heads

Taping equipment

Braiding equipment

Twister (small)

Armoring equipment

Wire drawing equipment (intermediate and fine)

Tinning equipment

Electrical test equipment (high and low voltages)

Applicators for asbestos insulation

Molding equipment for flexible cord plugs

Paint

Steps planned for immediate future follow. It is hoped that the final report will be submitted in January, but from

the following listing it will be noted that there is still a major part of the work to be accomplished. Help has been offered and is being used to gain time.

1. Complete tonnage analysis of market. Anaconda Price Books coming—TLG.

1a. Specific items for mfg.

2. Determine cost of necessary equipment types.

3. Establish crew sizes per production unit.

4. Determine amounts of various insulation and covering components required in various cable categories, along with material costs.

5. Assemble complete list of equipment required.

6. Make layout of equipment and determine floor space needed.

[fol. 5372] 7. Plan location of operations and building costs.

8. Estimate technical wire and cable personnel required.

9. Estimate MPC's.

10. Determine profits to be expected, based on current competitive prices.

11. Submit final report.

T. L. Gilbert.

TLG:jom
Attachment

CC: Messrs. N. B. Lane—Massena, H. C. Erskine—Pittsburgh, P. T. Coffin—Pittsburgh, J. L. Healy—Pittsburgh.
File

[Vol. 5373]

Table I
Market Analysis—Insulated Wire and Cable

Categories	1954 Sales		1957 Sales*		Projected 1967 Sales		Goal % of Market for Alcoa	Order Entry In Field	Remarks
	\$ MM	%	\$ MM	%	\$ MM	%			
Communications.....	267	23	470	31	1000+	40	5	4	Tie in with communication outfit necessary. Western Union suggested. Best growth potential. Hi degree of technical know-how required.
Power.....	(483)	(42)	(560)	(39)	(1200)	(47.5)			Over half is 600V or under. With CV line and present line could make volume items. Great variety of construction.
Power & Control Cable.....	174	15	230	15	460	18	5	3	Small sizes very competitive. Type TW can now be produced. Already in the business. Small field, and specialized.
Building Wire.....	195	17	270	18	540	21	5	2	Not included in survey. Missiles to become large factor here. (Going more to high temp. coverings (200°F-400°F) Over 50 specific types. Very competitive in small sizes.
Line Wire & Serv. Drop.....	88	8	80	5	110	4	15	(1)	
Marine.....	26	2		1	7	4.5	5	8	
Utilization.....	(325)	(28)	(340)	(23)	(310)	12.5			
Magnet Wire.....	175	15	180	12	(Excl. per FTC)	6	No.	No	
Automotive & Aircraft.....	63	5.5	70	5	150		5	5	
Flexible Cond.....	58	5	56	4	100	4	5	6	
Appliance & Fixture.....	29	2.5	33	2	60	2.5	5	7	
Unclassified.....	82	7	110	7	(No information)				
Total.....	1157	100	1510	100	2510	—			

* 1957 sales were 10% lower than 1956 on volume basis and 20% lower on \$ basis, due to decreased business activity and highly competitive market situation.

[fol. 5374] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 173

December 26, 1958.

T. L. Gilbert
Massena Works
Mr. L. T. Guess
Pittsburgh Office

Cc: Mr. F. A. Gunther, Pittsburgh, Mr. E. D. Mairs, Pittsburgh, Mr. G. Bright, Massena; Mr. E. E. Hickey, Massena, Mr. G. E. Martin, Massena, Mr. D. Harkins, Massena, File.

Re: Insulated Wire & Cable Survey

We in Massena are attempting to arrive at specific wire and cable constructions to be used in figuring type and amounts of equipment necessary and in estimating MFCs. It seems necessary that these types be passed on to you so that the work that Messrs. Gunther and Callahan and you do in determining construction component weights and relative popularity be done using the same bases. If you think that we have chosen some "foul ball" constructions, let me know. Also, if there are some popular items that we have omitted, we can readily add them at this time. The constructions were gleaned from catalogs from G.E., General Cable, and Anaconda.

Attached is a tabulation of the items that we have chosen in the general Power category, which includes Building Wires and Power Cables. Since we already have the necessary equipment for Line Wire and Service Drop Cables, there is no information included on these. The Monsanto classes of Communication and Utilization Wires and Cables are being worked up, and similar data will be sent to you when available. Copper wires and cables only are considered, since aluminum is only a small fraction of these cable types.

[fol. 5375] I expect to bring the results of our work to Pittsburgh for consolidation with your data on January 6.

T. L. Gilbert.

TLG/mlh
Attachment

Tentative Insulated Wire & Cables Chosen for Survey
(Categorized by NEMA Report Groupings)

I Building Wires & Cables**A. Rubber Insulated**

1. #2-7 strand RH-RW with 4/64 rubber insulation and a double braid jacket.
2. #2-7 strand RH-RW with 4/64 rubber insulation and a 3/64 Neoprene jacket.
3. #2-7 strand RHW with 4/64 heat and moisture resistant rubber insulation and a 3/64 Neoprene jacket.
4. #2-7 strand RR with 4/64 code rubber insulation and 3/64 rubber jacket.

B. Non-rubber Insulated

1. #2-7 strand TW with 4/64 PVC.
2. Non-Metallic sheathed cable composed of 2-#10 7-strand conductors each with 2/64 PVC insulation and paper tape and 1-#12 solid ground. A filler is run opposite the ground wire, and the composite is jacketed with a saturated and painted double cotton braid.
3. 60°C Fixture wires—#16-26 strand (.010" individual wires) with 2/64 PVC insulation.
4. 90°C Fixture wires—#16-26 strand (.010" individual wires) with 2/64 service rigid PVC.

II Power and Control Cables—Rubber and Plastic**A. Control Wires**

1. 90°C Switchboard Wire—#12 solid with .020" PVC insulation plus .020" asbestos plus .016" flame resistant cotton braid.
2. #12-7-strand single conductor TW control wire with 3/64 PVC insulation.
3. #12-7 strand multiple conductor (10 conductors per cable) control cable with .020" PE insulation and .010" PVC jacketing on individual conduc-

tors, and with glass-reinforced tape and 4/64 PVC jacket on composite cable.

- [fol. 5377] 4. #12-19-strand multiple conductor (10 conductors per cable) control cable with 3/64 RH rubber insulation on individual conductors and with cotton tape and 5/64 Neoprene jacket on composite cable.

B. Power Cables

1. #2-7-strand, 600 v. *type RR* with 4/64 rubber insulation and 3/64 Neoprene jacket.
2. #2-7-strand, 600 v. *type RHW* for conduit and aerial use with 4/64 rubber insulation and 2/64 Neoprene jacket.
3. #2-7-strand, 600 v. *type RHW* for direct burial (USE) with 4/64 rubber insulation and 3/64 Neoprene jacket.
4. #2-19-strand, 5 KV for conduit, with 10/64 rubber insulation over a semi-conducting tape and 4/64 Neoprene jacket.
5. #2-19-strand, 5 KV non-shielded direct burial cable with 10/64 RW rubber insulation over semi-conducting tape and a 3/64 Neoprene jacket.
6. 4/0-19-strand, 5 KV shielded direct burial cable with a semi-conducting tape, 10/64 rubber insulation, a second semi-conducting tape, a shielding tape, a rubber filled tape, and a 5/64 Neoprene jacket.
7. 4/0-19-strand, 5 KV cable for either grounded or ungrounded service, with semi-conducting tape, 10/64 PE insulation, second semi-conducting tape and 5/64 PVC jacket.
8. 4/0-19-strand, 7500 volt cable for grounded neutral service, with semi-conducting tape, 12/64 rubber insulation, shielding tape, rubber filled tape, and 5/64 Neoprene jacket.
9. 4/0-19-strand, 7500 volt cable for ungrounded neutral service, with semi-conducting tape, 16/64 rubber insulation, shielding tape, rubber filled tape, and 6/64 Neoprene jacket.
10. 4/0-19-strand, 15 KV cable for grounded neutral service, with semi-conducting tape, 19/64 rubber

insulation, shielding tape, rubber filled tape, and 6/64 Neoprene jacket.

11. 4/0-19-strand, 15 KV cable for ungrounded neutral service, with semi-conducting tape, 27/64 rubber insulation, shielding tape, rubber filled tape, and 7/64 Neoprene jacket.

[fols. 5378-5379] 12. #3 AWG, 300 v. SE cable with two #3-7-strand phase wires insulated 4/64 type rubber, taped with cellophane, and covered with cotton braid. Two phase wires served with fine wire neutral conductor, covered with moisture sealing tape and glass-cotton heat and moisture resistant braid, then painted.

13. #2 AWG, 300 volt USE cable with three #2-7-strand phase wires each insulated with 4/64 RHW rubber and taped. Fillers are added and the composite is taped and then jacketed with 7/64 Neoprene.

14. 5 KV Series Lighting—#6 solid with 10/64 PVC insulation.

15. 5 KV Series Lighting—#6 solid with 6/64 PE insulation and 3/64 PVC jacketing.

16. 5 KV Series Lighting—#6 solid with 110 mil. PE insulation.

17. 5 KV Series Lighting—#6 solid with 6/64 Butyl rubber insulation and 3/64 Neoprene jacket.

[fol. 5380] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT-175

Mr. H. C. Erskine, Pittsburgh

January 2, 1959.

From: T. L. Gilbert,
Massena Works.

To: Mr. E. D. Mairs,
Pittsburgh Office.

Re: Insulated Wire and Cable Survey

This letter will show progress made thus far on the survey, plus the items we hope to get underway during our next week's visit to Pittsburgh.

A. Progress So Far

1. List of Products to be Manufactured

Over 60 types have been listed. This information has been forwarded to Pittsburgh personnel for comment and so that relative popularity of each and weights of their components can be worked up.

2. Types and Costs of Equipment

These are now firmed up to varying degrees. We expect to get remaining necessary information from suppliers whom Mr. Andrews is arranging to have on hand for discussions.

3. Direct Materials Needed for Cables

We have a practically complete list, with purchase prices on most of them.

4. Machine Production Rates

Okay on those with which we are familiar. Will get information on others from next week's discussions.

5. Crew Sizes

Depends greatly on amount of equipment and layout. To be figured later.

6. Operational Sequence for Each Cable Type

Listed except for a few exceptions such as on telephone cables.

7. Relative Volumes of Main Categories

Based on NEMA 1955 report, dollar sales volume has been converted to tonnages in five or six main categories of cables.

[fol. 5381] 8. Old Smelting Building Facility Layout

A 20 foot-to-the-inch sketch of existing buildings is being drawn up for later layout use.

B. Work to be Done on Next Week's Visit

1. Talk to machinery suppliers to get balance of price, speeds, floor area and size ranges needed.

2. Get component weights on typical cables.

3. Convert the relative sales popularity of different cables into tonnages.

4. Get work started on transportation costs to markets.

5. Work with Mr. Healy on MFC development.

6. Develop rough ideas for equipment layout.

7. Determine policy on purchase of equipment for ini-

tial use on copper and later use on aluminum (particularly wire drawing).

8. Pick selling prices from published competitive price schedules for use in determining profit margin.

9. Determine method of merchandising insofar as it might affect discounts.

10. Arrange to get test specifications for such categories as Telephone Cables.

The survey has begun to shape up so that a final report date of late January appears attainable.

T. L. Gilbert.

TLG:jom

CC: Messrs. H. C. Erskine, Pittsburgh, P. T. Coffin—L. T. Guess, Pittsburgh, J. L. Healy, Pittsburgh, R. W. Andrews, Jr., Pittsburgh, J. A. MacLeod, Pittsburgh, N. B. Lane, Massena.

File

Messrs. E. E. Hickey, G. R. Bright, G. E. Martin, D. C. Harkins, NNOO.

[fol. 5382] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 178

January 12, 1959.

Philip T. Coffin,
Pittsburgh Office.

Mr. F. J. Close,
Pittsburgh Office.

Re: Insulated Conductors

We need the services of the Commercial Research Department to help us make an overall study in regard to Alcoa's broad participation in the insulated wire and cable field. This study is being made at the request of Mr. Magee. A task force, with Mr. E. D. Mairs as Chairman, is investigating manufacturing facilities, geographic aspects, etc. In order to complete a study of manufacturing facilities, further knowledge of the market is necessary.

This study, giving some general recommendations, must be completed by the end of February. The Commercial Research group can be most helpful in determining:

(1) Market by classifications for building wire, power cables, utilization wire, flexible cords, appliance and fixture wire, and communications, with special reference to size breakdown.

(2) Geographic center of market for insulated conductors.

(3) Areas where penetration of aluminum into this market new held by copper appears most favorable.

(4) Geographic location of plants by competitors.

A simple review of published information should be satisfactory for this study. (The Commercial Research group is more familiar with sources of this information than members of Mr. Mair's task force.) A more detailed study may be required later.

Philip T. Coffin.

PTC:ags

CC: Mr. E. M. Strauss—Pittsburgh, Mr. E. D. Mairs—Pittsburgh.

[fol. 5383] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 179

The Market for Insulated Copper Conductor

Commercial Research Division

January 17, 1959

T. Allen Johnston.

[fol. 5384]

Introduction

This study was made to determine several market aspects of the insulated copper wire and cable market.

Due to a limited amount of time, only published data was examined. Field interviews were conducted with personnel of McGraw-Hill Publishing Co. and the Bureau of the Census, Department of Commerce. No information that could be considered of definite value to this study was obtained from these field interviews.

Data to be obtained were as follows:

1. Market by conductor type and size;
2. Market center for insulated conductors;
3. Conductor types and sizes offering best opportunities for aluminum;
4. Location of competitors' plants.

This report covers only the data obtained by the Commercial Research Division in the limited time available.

[fol. 5385] **Market by Conductor Type and Size**

The only published data on conductor types was found in the 1954 Census of Manufactures, and page 36B-11 of the Electrical Appliances and Lamps; Insulated Wire and Cable, and Engine Electrical Equipment Bulletin is shown in Exhibit I.

Total sales (manufacturer's selling price) in 1954 were \$1,135 million dollars. The largest single conductor group was communications wire and cable with a dollar value of \$248 million or almost 25% of total dollar sales.

Exhibit I shows total sales of both insulated wire and cable manufacturers who represent about 30% of the total and the wire drawers who produce the balance of 70 per cent. If a company buys pig, ingot, wire bar, or redraw rod and draws its wire to final size before covering, it is classified by Census as Wire Drawing rather than insulated cable manufacturing. Only those companies purchasing wire drawn to size and then covering are classified as Insulated Wire and Cable manufacturers.

Tonnage of copper consumed for insulated wire and cable by both the Wire Drawing and Insulated Wire and Cable industries in 1954 is estimated to be one billion pounds.

Tonnage of metals consumed by individual wire and cable types shown in Exhibit I is not available as Census did not collect such tonnage data and it will not collect such

Product Code	Product	Unit value of quantity including interest, in U.S. dollars	
		1944	1945
3311	Insulated wire and cable, including appliance wire and cord and flexible cord wire, etc.	1,137,444	1,137,444
3311	Communication wire and cable	247,773	247,773
33111	Control cable:		
331111	Lead covered.....	3,341	27,752
331111	Flexible.....	3,341	1,374
331112	Lead and lead-cloth wire.....	12,131	21,704
331113	Drop and twist wire.....	19,341	1,006
331114	Distribution and jumper wire.....	10,746	6,143
331115	Inside and duct telephone wire.....	6,427	63,211
331116	Paper-insulated, lead-covered except control.....	80,643	12,175
331117	Substation cable.....	12,175	21,704
331118	Other communication wire and cable.....	12,175	21,704
3312	Other insulated wire and cable.....	778,222	1,137,444
331211	Signal wire and cable.....	12,422	7,224
331212	Signal wire:		
3312121	Enamelled, including synthetic resin enamel (including combinations of enamel with other coverings)	124,222	12,422
3312122	Enamelled only.....	12,422	21,704
3312123	Enamelled and covered.....		
331213	Not enamel:		
3312131	Glass covered.....	10,726	10,726
3312132	Other.....	20,277	22,628
331214	Weatherproof and also burning wire:		
3312141	Enamelled (including also burning).....	42,277	
3312142	Other covered.....	4,227	78,224
3312143	Thermoplastic covered.....		
3312144	Polysulfone (impregnated) covered.....	36,422	
331215	Building wire and cable, except varnished enameled cable (insulated):		
3312151	Fluorocarbon covered and/or jacketed (including lead-covered).....	42,277	42,277
3312152	Nonflexible enamel cable or conductor.....	19,244	21,704
3312153	Nonflexible enamel cable or conductor.....	19,244	21,704
331216	Service cable (including self-supporting type but excluding service entrance cable):		
3312161	Enamelled.....	29,277	
3312162	Thermoplastic insulated.....	29,277	29,277
3312163	Service entrance cable.....	21,422	17,422
3312164	Enamelled (see 3312161).....	12,422	1,422
3312165	Other building wire and cable (including varnished enameled cable).....	10,277	
331217	Power wire and cable:		
3312171	Enamelled cable:		
33121711	Portable power cable.....	19,277	14,422
33121712	Fixed cable.....	4,422	11,776
33121713	Varnished enameled insulated (including varnished enameled building wire).....	1,310	6,710
33121714	Enamelled.....	44,422	12,422
33121715	Enamelled (including building wire).....	4,422	1,310
33121716	Enamelled and asbestos-varnished enameled.....	4,422	3,744
33121717	Other power wire and cable, other than cable.....	9,277	
331218	Oil cable and higher:		
3312181	Portable power cable.....	3,341	3,744
3312182	Fixed cable.....	4,422	14,422
3312183	Paper insulated.....	40,422	21,422
3312184	Enamelled.....	20,422	12,277
3312185	Other power wire and cable, oil cable and higher.....	3,022	1,322
331219	Armature and aircraft type wire and cable:		
3312191	Armature ignition wire and cable (except harness wire).....	3,422	
3312192	Aircraft wire, other than ignition.....	12,175	
3312193	Armature battery, starter, and other primary wire and cable (except cable wire).....	1,322	1,322
3312194	Other armature and aircraft type wire and cable (including cable wire and enameled battery cable).....	14,422	
331220	Service wire and cable (U.S. Navy and Merchant Marine).....	21,704	4,776
331221	Other insulated wire and cable.....	63,211	21,704
331222	Enamelled wire and cable, not specified by kind.....	3,744	
3313	Appliance wire and cord and flexible cord wire.....	100,422	78,224
331311	Flexible cord wire.....	40,422	29,776
331312	Appliance wire and cord:		
3313121	Fluorocarbon wire (including heat resistant).....	10,277	8,224
3313122	Flexible cord (including heater cord):		
33131221	Enamelled.....	20,422	39,277
33131222	Thermoplastic insulated.....	10,277	4,776
33131223	Other appliance wire and cord.....		
33131224	Appliance wire and cord and flexible cord wire, not specified by kind.....	2,277	

See footnotes at end of table.

[fol. 5387] tonnage data in the 1958 Census of Manufactures now underway.

There is no published data available on covered conductor sales or production by size.

Market Centers for Insulated Conductors

Based on Alcoa's 1957 shipments of covered aluminum conductors the market center was located at Elsberry, Missouri.

Using 1954 Census of Manufactures data of consumption by manufacturing establishments, the center for insulated copper was Central Illinois. Due to Census restrictions on disclosure of data, this center is less exact than that for Alcoa shipments but it is of interest to note the relative proximity of these centers.

No utility consumption of insulated copper wire is included in the Census of Manufactures, and a reasonable assumption would be that the insulated copper market center be slightly to the east of the above center.

Insulated Conductor Types Offering Best Potentials for Conversion to Aluminum

Conductor types offering the best potentials for aluminum are those where the metal cost is the greatest proportion of total conductor cost.

Fine sizes of aluminum wire will be less advantageous than equivalent conductor sizes of copper wire. This will probably eliminate branch circuit wire at the present aluminum-copper price relationship.

The conductor types offering the best potentials initially are:

- Power & Feeder Cable #8 and larger,
- Aircraft Cable
- Aerial Cable
- Welding Cable

Other conductor types and sizes may well have merit as aluminum conductors, but a detailed study would be necessary.

Location of Insulated Copper Conductor Plants

Exhibit II and accompanying tables show the location of the ten leading manufacturers of insulated copper conductors. The ten leading competitors were obtained from a market research report of Monsanto Chemical Co.

Okonite Co. is shown as a separate company and not combined with Kennecott which previous to the Okonite acquisition was not in the first ten insulated copper conductor manufacturers.

[fol. 5389] Locations by State of Insulated Wire and Cable Plants of Ten Leading Insulated Copper Wire and Cable Manufacturers 1958

State	Number of Plants
New Hampshire	
General Cable	1
Simplex Wire & Cable Corp. ¹	1
Massachusetts	
General Cable Corp. (Cornish Wire Co., Inc.) ²	1
General Electric Co.	1
Simplex Wire & Cable Corp.	1
Connecticut	
General Electric Co.	1
Rhode Island	
General Cable Corp.	1
New York	
General Cable Corp.	1
Phelps Dodge Copper Prod.	1
Rome Cable Corp.	1
Western Electric	1
New Jersey	
General Cable Corp.	3
Okonite Co. ⁴	3
Phelps Dodge Copper Prod. ³	1
Triangle Conduit & Cable Corp.	1
Western Electric Corp.	1
Maryland	
General Cable Corp.	1
Western Electric Corp.	1
North Carolina	
Essex Wire Corp.	1
Georgia	
Anaconda Wire & Cable Corp.	1
Florida	
General Cable Corp.	1
Tennessee	
General Cable Corp.	1
[fol. 5390]	
Alabama	
Essex Wire Corp.	1
Ohio	
Essex Wire Corp. ⁵	1

State	Number of Plants
Indiana	
Anaconda Wire & Cable Corp.	1
Phelps Dodge Copper Prods.	1
Michigan	
Essex Wire Corp.	1
Illinois	
Anaconda Wire & Cable Corp.	1
Essex Wire Corp.	1
General Cable Corp. ¹	1
Western Electric Corp.	1
Missouri	
General Cable Corp.	1
Nebraska	
Western Electric Corp.	1
Texas	
General Cable Corp.	1
Montana	
Anaconda Wire & Cable Corp. ²	1
California	
Anaconda Wire & Cable Corp.	1
Essex Wire Corp.	1
General Cable Corp. ³	2
General Electric Co.	1

Notes:

¹ Submarine Cable, only.² Cornish Wire, Inc. acquired by General Cable Corp. in January 1959.³ Weatherproof (Textile Covered, only).⁴ Telephone Cable, only.⁵ Okonite Co. acquired by Kennecott Copper Corp. in late 1958.⁶ Miscellaneous Conductors.

Source: Monsanto Chemical Co. BDSA—U.S. Dept. of Commerce.

[fol. 5391] Location of Plants of Ten Leading Insulated Copper Wire and Cable Manufacturers 1958

Anaconda Wire & Cable Co.

Black Eagle, Montana¹

Marion, Indiana

Orange, California

Sycamore, Illinois

Watkinsville, Georgia

Essex Wire Corp.

Mt. Airy, N. C.

Sycamore, Illinois

Tiffin, Ohio²

North Birmingham, Alabama

Detroit, Michigan

Anaheim, California

General Cable Corp.

Bayonne, N. J.

Emeryville, California

Los Angeles, California

Perth Amboy, N. J.

Rome, N. Y.

St. Louis, Mo.

Monticello, Illinois³

Tampa, Fla.

New Brunswick, N. J.

Providence, R. I.

State

Memphis, Tenn.
Baltimore, Maryland
Concord, N. H.
Boham, Texas

Williamstown, Mass. (Cornish Wire Co., Inc.)^a

General Electric Co.
Bridgeport, Conn.
Lowell, Mass.
Oakland, California

Okonite Co.^b

Passaic, N. J.
Paterson, N. J.
New Brunswick, N. J.

Phelps Dodge Copper Products Corp.

Bayway, N. J.^c
Yonkers, N. Y.
Ft. Wayne, Ind.

[fol. 5392]

Rome Cable Corp.
Rome, N. Y.

Simplex Wire & Cable Corp.
Cambridge, Mass.
Newington, N. H.^d

Triangle Conduit & Cable Corp.
New Brunswick, N. J.

Western Electric Corp.
Baltimore, Md.
Kearny, N. J.
Chicago, Ill.
Buffalo, N. Y.
Omaha, Nebraska

Notes:

^a Miscellaneous Conductors, only.

^b Telephone Cable, only.

^c Weatherproof (Textile Covered), only.

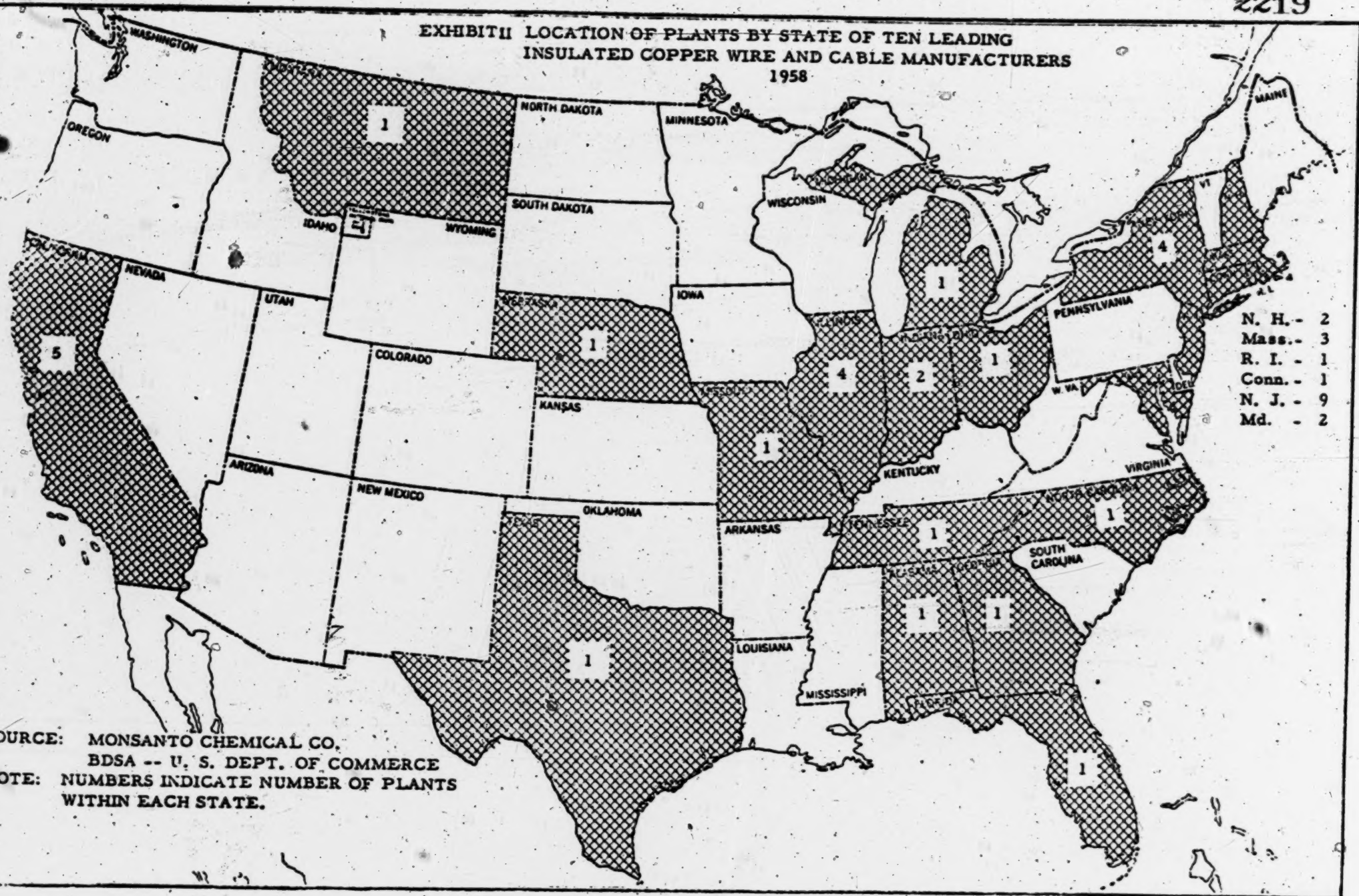
^d Submarine Cable, only.

^e Okonite Co. acquired by Kennecott Copper Corp. late in 1958.

^f Cornish Wire Co., Inc. acquired by General Cable Co. in January 1959.

Source: Monsanto Chemical Co. BDSA—U.S. Dept. of Commerce.

**EXHIBIT II LOCATION OF PLANTS BY STATE OF TEN LEADING
INSULATED COPPER WIRE AND CABLE MANUFACTURERS
1958**



SOURCE: MONSANTO CHEMICAL CO.
BDSA -- U. S. DEPT. OF COMMERCE
NOTE: NUMBERS INDICATE NUMBER OF PLANTS
WITHIN EACH STATE.

[fol. 5395] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 180

Alcoa

First in Aluminum
Aluminum Company of America
1501 Alcoa Bldg., Pittsburgh 19, Pa.

News Release

For Further Information: Gordon C. Meek, ATlantic
1-4545, Ext. 465

For Immediate Release, Thursday, Jan. 22, 1959

Pittsburgh, Pa., Jan. 22, 1959—Rome Cable Corporation and Aluminum Company of America today announced plans to affiliate.

Frank L. Magee, president of Alcoa, and A. D. Ross Fraser, president of Rome Cable, announced that agreement has been reached on a plan by which Alcoa will acquire all the properties of Rome Cable for 355,226 shares of Alcoa common stock. This will permit distribution to Rome shareholders of three shares of Alcoa common stock on each five shares of Rome common stock. The agreement is contingent upon approval of Rome shareholders, who will meet on March 25. If approved, it will take effect immediately.

Alcoa and Rome plan to combine their electrical conductor, conduit, and accessory activities in a new company to be called Rome Cable Company. The present members of Rome's management will continue in their present capacities in the newly formed company. Mr. H. T. Dyett will retire, as chairman of the board of Rome Cable, when and if the agreement is consummated, rather than at the annual meeting in June, as previously planned; but he will continue to serve on the board of directors of the new company. Alcoa plans to continue the fundamental policies established by the Rome management, and no major changes in personnel or operating procedures are anticipated.

[fol. 5396] Rome Cable Corporation shares currently are listed on the New York Stock Exchange. The company has

approximately 2,500 shareholders. Rome Cable's net sales for the year ending March 31, 1958, amounted to \$40,615,000. Annual sales have averaged \$47-million over the past five years. The company has approximately 1,500 employees. It operates manufacturing plants at Rome, N. Y.; Torrance, Calif.; and Collegeville, Pa., as well as sales offices in principal cities of the United States.

Rome is best known for its broad line of quality insulated wire and cable products—chiefly made of copper—and for its steel conduit and other wiring systems. Its products are sold to electric utilities, electrical manufacturers, other wire fabricators, industrial users, wholesalers, mines and oil companies. A number of specialty products are made for the military services, especially for use in the missile program.

Rome Cable was founded 23 years ago and has grown rapidly during that time. It is well known in the electrical industry for the emphasis it has placed on research and development activities. During 1958, the company opened a new research center at Rome, N. Y., in order to stimulate further progress in the development of new products and new and improved manufacturing processes and practices. Nearly 40 per cent of the company's sales during the year ending March 31, 1958, came from items that Rome did not manufacture prior to 1950.

[fol. 5397] For more than 60 years, Alcoa has pioneered in the development of aluminum as an electrical conductor. It produces aluminum wire and cable, bus conductors, conductor accessories, conduit, and windings of aluminum sheet and foil for electric transformers and condensers. One of the company's research laboratories is devoted exclusively to the development of new products and processes for the electrical conductor industry.

"Our proposed affiliation with Alcoa," Mr. Fraser said, "is very much in the best interest of Rome's employees, shareowners, and customers. It will make possible more complete service to customers by taking advantage of the combined production and marketing of Alcoa's line of aluminum conductor products, as well as bare and insulated wire and cable products produced by Rome. The coordinated research and development activities of Rome and

Alcoa will provide improved services to the electrical industry."

"The plan that will be submitted to Rome's shareholders," Mr. Magee said, "will make possible greatly improved service to the rapidly growing electrical industry. For many years Alcoa has specialized in the production and sale of bare aluminum conductors, with emphasis on the popular aluminum cable steel reinforced (A.C.S.R.) for electric transmission and distribution lines. More recently, Alcoa has been offering a limited line of insulated aluminum conductors. Rome Cable's complete facilities for the production and sale of many types of insulated wire and cable, as well as bare copper conductors, will fully complement Alcoa's facilities and enable the new organization to meet the increasingly complex requirements of the electrical industry."

[fol. 5398] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 181

Alcoa
First in Aluminum
Aluminum Company of America
1501 Alcoa Bldg., Pittsburgh 19, Pa.

News Release

For Release at 7:30 P.M., EDST, Monday, June 15, 1959,
Or Anytime Thereafter

Rome, N.Y., June 15, 1959—The new combination of Rome Cable Corporation and Aluminum Company of America has greatly enhanced opportunities for both concerns to share in the growth of the rapidly expanding U.S. electrical industry.

This bright outlook for the two companies and their personnel was foreseen tonight by Alcoa President Frank L. Magee, in response to a welcome extended to Alcoa by the officers and directors of Rome Cable.

Mr. Magee said both firms should realize future benefits from forthcoming joint effort by their respective research

organizations, increased facilities for production, and broadened sales and distribution networks.

Coupled with these advantages, said Mr. Magee, will be improved opportunities for market exploitation because the product lines of both Rome and Alcoa will, for the first time, be rounded out to provide a full complement of electrical conductor and accessories in aluminum, copper, and steel.

Mr. Magee spoke at the Rome Country Club before an audience which included officials of Rome Cable and Alcoa, and area civic and business leaders.

[fol. 5399] Alcoa officers who flew to Rome today with Mr. Magee were: I. W. Wilson, company board chairman; M. M. Anderson, Leon E. Hickman, and Lawrence Litchfield, Jr., executive vice presidents; Ralph V. Davies, Harold C. Erskine, and Edward B. Wilber, vice presidents; and Alfred M. Hunt, company secretary and director. The group was accompanied by Philip T. Coffin, Alcoa's manager of electrical industry sales, and John L. Fleming, general manager of public relations.

A tour of Rome Cable's Research Laboratory and a meeting of the concern's board of directors preceded luncheon at the country club with a group of Rome Cable management people. A. D. Ross Fraser, president of the new Alcoa subsidiary, welcomed the visitors.

The Alcoa group devoted the afternoon to a tour of the Rome Cable plant and to a press conference attended by area newspaper, television, and radio station representatives, before returning to the country club for dinner.

Mr. Magee told the gathering that Alcoa regarded Rome Cable's experience, talent, and long demonstrated teamwork as more important than the purchase of the firm's plants and equipment.

"The people of Rome Cable are now Alcoa people," he said, adding that Rome's organization will remain intact and that Rome employees now will share in Alcoa employee benefits and job opportunities throughout the parent organization.

[fol. 5400] Alcoa's president lauded the community regard Rome Cable's people had developed toward their

company and themselves during their long tenure, and termed this another corporate asset which Alcoa prized and would seek to preserve and nourish.

[fol. 5401] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 183

cc: E. C. West

To: Mr. J. R. Woods

From: C. J. McMurtry

Date: April 2, 1959

Subject: Tennessee Valley Authority, Chattanooga, Tennessee

Dear Jack:

As you will recall, last January we had correspondence about getting on the approved list of TVA for aluminum conductor transmission cable. It was set up that at the first opportunity, probably this fall, they would visit our plant for an inspection.

In view of the fact that we are now a division of Alcoa, it would seem that I should kill this request with TVA on these grounds. Have you any comment otherwise?

Sincerely, M.

CJM:wg

2226

[fol. 5402] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 184

cc: E. C. West

C. J. McMurry—Atlanta
J. R. Woods—Rome
April 7, 1959
Tennessee Valley Authority

Dear Mac:

With reference to your memo of April 2nd, it would seem certain that we will ride in on Alcoa's approval, so I agree that there is not much to be gained by pursuing the matter further. If, by any chance, a question does come up we will have to reconsider.

Very truly yours, —, —.

JRW:reh

[fol. 5403] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 185

Alcoa Private Wire

23 PI CT 4-14-60
H. H. Rodee.

Re TVA. Mr. Harry Hicks asking whether we are making ACSR at Rome and if so whether a TVA inspection team of from 5 to 8 engineers could obtain clearance to inspect the facilities at Rome Cable sometime this year, possibly this summer. Will we give approval.

Lindsey M. Hall, Chattanooga.

[fol. 5404] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 186

Telegram

This Copy for T.V.A

To: Lindsey M. Hall, Chattanooga.
W. W. Knapp, Rome (By Mail).

4/14/60.

Retel TVA we are not making and do not contemplate making ACSR at Rome. Therefore assume TVA engineers will have no interest in inspecting Rome facilities.

HHR:BHA

H. H. Rodee.

[fol. 5405] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 187

A. D. R. Fraser
C. H. Ellis
G. W. Commerford
L. D. Fidler
F. P. Baumler
T. D. Bylin

July 10, 1959.

Aluminum Capacities
Based on factor of 47/.0772 Ech. 19

Stranding:

1,000,000 ft. (39,000#) per week, could be available starting in 2 weeks.

Properzi—Casting:

Present operation 10 hours per day 6 days a week—1 machine—approximately 100,000# per week.

Could have an additional 100,000# per week in approximately 3 weeks by adding another shift.

2228

Drawing:

Operating at 88% capacity—will operate at 100% week of July 27, 1959. Will have available 15,000# per week additional.

Insulating—Polyethylene: Singles:

One machine—#5 plastic approximately 840,000' per week—3 shifts available in about 1 week to juggle men back to machines.

Edmonds—#885:

Twisting self supporting capacity 750,000 ft. per week. Filled to capacity through week of July 27, 1959 on 3 shift basis.

Note: Increase to 3 shifts due to approximately 50% of Pittsburgh Requirements for July.

Edmonds #870:

A smaller machine—operating 1 shift has capacity of approximately 40,000' per shift or 400,000 feet per 5 day week—would be available in 2 weeks after break-in of necessary help.

T. D. Bylin.

TDB k

[fol. 5406] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 189

February 8, 1936. ☐ACCOUNTING DEPARTMENT
COST DIVISION
PITTSBURGH OFFICEMR. P. T. COFFIN
PITTSBURGH OFFICERE: CABLE PRICES

In accordance with your recent request, we have shown below the prices necessary to return 20% margin on capital for a representative group of cable sizes. Also shown are current schedule prices:

<u>Size and Stranding</u>	<u>Price Necessary To Return 20% Margin On Capital</u>	<u>Current Schedule Price</u>	<u>Increase or (Decrease)</u>
#1/0 6/1 A.C.S.R.	\$.324	\$.313	\$.011
#4 7/1 A.C.S.R.	.308	.320	.016
795,000 25/7 A.C.S.R.	.310	.315	.004
900,000 54/7 A.C.S.R.	.330	.328	.011
336,400 19 All Alum.	.396	.390	.006
795,000 37 All Alum.	.385	.375	(.009)

J. L. HEALY

JLN:haw

[fol. 5407] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 191

February 20, 1956.

Accounting Department,
Cost Division,
Pittsburgh Office.
Mr. D. Wilmot
Pittsburgh Office

Electrical conductor file

Re: Electrical Conductor Cable and Redraw Rod Prices

In line with our conversation this morning, attached is a table supplementing the information included on the tables prepared last week, of which you have a copy.

Based on current costs, an average price increase of \$.015 per aluminum pound is needed on cable in order to return 20% on capital employed. This is notwithstanding that in 1948, cable shipments were returning slightly better than 20% on capital, and price increases since 1948 have apparently been adequate to cover increased costs of metal, steel wire and labor. The reasons for this are as follows:

1. In 1948 we had only one plant—Massena—and the invested capital and overhead expense was accordingly much lower.
2. With only one plant in operation, we were operating at that time at close to 100% of capacity as compared to today's operations of only slightly better than 50%.
3. Our change in basis of allocating G.A. & S.E., effective the first of 1955, results in approximately \$.008 per pound, increased assessment of G.A. & S.E. against this product.

It seems to me that the significant point in this is that our present need for price increases in cable is occasioned by changes in our own facilities and operating practices. Since our competitors have not necessarily had parallel circumstances, we should be aware of the fact that

[fol. 5408] any price increase at this time, although needed by Alcoa, may increase the margin available to a competitor to a point beyond that which has ever been available to him since 1948.

This, of course, can be eliminated, insofar as non-integrated competitors are concerned, by making a corresponding price increase in redraw rod. The attached table indicates that a price increase of \$.014 would be needed to offset a \$.015 price increase in cable. With a price increase of \$.014, redraw rod would return 40% on capital employed. Prior to 1954, redraw rod has always returned a margin equivalent to 30% return or better. A possible pattern of price increases which would return approximately what is needed, without unduly opening the spread between redraw rod and cable, might be as follows:

	Total Price Increase	Increased Net Margin	% Return on Capital (Allowing for 10% Labor Increase)
E. C. Pig.....	\$.005	\$.005	
Redraw Rod.....	.014	.009	30%
Cable.....	.018	.013	18%

The above pattern would obtain approximately the price increase needed to recover a 10% labor increase and obtain 20% return on capital for cable, although a small portion of the increased margin would be reflected in pig margins. The increase in spread to a competitor using redraw rod would be only \$.002 per pound after consideration of his scrap loss factor.

T. H. Kerry.

THK:SPC

Attachment

[fol. 5409]

% Return Resulting
From Price Increase if
E. C. Pig Price Increased
\$.005 Per Pound

	At Current Costs	Allowing For a 10% Labor Increase	At Current Costs	Allowing For a 10% Labor Increase
Cable Price Increase Needed to Return 20% on Capital Employed at 70% Utilization.	\$.015	\$.018	18%	19%
Redraw Rod Price Increase Needed to Return 30% on Capital*	.007	.009	23	26
Redraw Rod Price Increase Needed to Retain Spread Ass- suming Cable Price Increases Shown Above.....	.014	.017	33	37
Redraw Rod Margin and % Return After Each Price Change	Former Basis or Allocation of G.A.&S.E. Margin/Lb.	% Return	Present Basis for Allocation of G.A.&S.E. Margin/Lb.	% Return
Price Change Effective				
10-11-48.....	\$.029	54%		
1-27-50.....	.024	50		
10- 4-50.....	.021	43		
8- 4-52.....	.021	33		
1-23-53.....	.024	40		
8- 9-54.....	.021	29		
1-13-55.....	.021	29	\$.011	16%
8-11-55.....	.024	34	.014	20

* Redraw Rod is currently returning 20% (assuming increased efficiency at Massena). Based on prior years performance, this product should return at least 30%.

[fol. 5410]

Increase in Base Cable Price from 10-11-48 to 8-11-55.....	\$.107/Al. lb.
Increase in Cost to Competitor of Redraw Used in Cable.....	\$.073 ⁽¹⁾
Estimated Increase in Cost of Steel Core Wire....	.020
Estimated Increase in Labor Based on Alcoa's Costs	.012
Estimated Increase in Transportation Costs.....	.000
Estimated Increase in Cable Prices in Excess of Competitors' Cost Increases.....	.105
	\$.002/Al. lb.

⁽¹⁾ Based on \$.070 per pound increase in redraw sales price, 90% recovery in cable production and \$.047 per pound increase in scrap prices.

Segregated loose scrap today.....	\$.185
Segregated loose scrap 10-11-48.....	.138

\$.047

2-14-56

[fol. 5411]

% Return Resulting
From Price Increase if
E. C. Pig Price Increased
\$.005 Per Pound

	At Current Costs	Allowing For a 10% Labor Increase	At Current Costs	Allowing For a 10% Labor Increase
Cable Price Increase Needed to Return 20% on Capital Employed at 70% Utilization.	\$.015	\$.018	18%	19%
Redraw Rod Price Increase Needed to Return 30% on Capital*	.007	.009	23	26
Redraw Rod Price Increase Needed to Retain Spread As- suming Cable Price Increases Shown Above.....	.014	.017	33	37
Redraw Rod Margin and % Return After Each Price Change	Former Basis for Allocation of G.A.&S.E. Margin/Lb. % Return		Present Basis for Allocation of G.A.&S.E. Margin/Lb. % Return	
Price Change Effective				
10-11-48.....	\$.029	54%		
1-27-50.....	.024	50		
10- 4-50.....	.021	43		
8- 4-52.....	.021	33		
1-23-53.....	.024	40		
8- 9-54.....	.021	29		
1-13-55.....	.021	29	\$.011	16%
8-11-55.....	.024	34	.014	20

* Redraw Rod is currently returning 20% (assuming increased efficiency at Massena). Based on prior years performance, this product should return at least 30%.

[fol. 5412] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 192

This Copy To: Mr. P. T. Coffin

August 26, 1957.

W. B. Howard
Pittsburgh Office
Mr. R. B. McKee
Pittsburgh Office

Received May 1, 1959. Genl. Files.

Re: Central Cable Company

In accordance with your request we have prepared the following chart and tabulations covering shipments to the captioned company, and comparisons between the prices of aluminum pig, re-draw rod and aluminum conductors:

- I. Shipments for 1951-57 (January-June).
- II. Estimated Spread Between E.C. Grade Re-Draw Rod, ACSR Scheduled and Competitive Prices (Composite Conductor).
- III. Estimated Spread Between E.C. Grade Re-Draw Rod, ACSR Scheduled and Competitive Prices (Aluminum Content Only).
- IV. Comparative Prices Aluminum Pig, E.C. Grade Re-Draw Rod, and ACSR 1948-1957.

In discussing the problem with Mr. Coffin, he suggested that the average price of #4, #1/0, #4/0 and 397,500 C.M. sizes of conductors be used for the basis of comparison. He also kindly estimated, from our own revenue figures, competitive prices which have been in effect to a greater or lesser degree since 1952. In view of the fact that Alcoa has neither control of steel core wire prices nor our competitors stranding costs, it was decided to consider the aluminum content of ACSR separately from the complete composite conductor. The tabulation and the chart, therefore, include aluminum content as well as ACSR figures.

Conclusion: Table III indicates that the aluminum content of ACSR in 1948 was approximately 33½¢ per pound. The spread between it and re-draw at that time was 11½¢. By and large, the same ratio of spread has existed since [fol. 5413] that time and today with the aluminum content in the scheduled price of ACSR at 54½¢ per pound, the spread has increased to 20¢. This comparison clearly indicates that the conductor scheduled prices have been increased properly with the price of re-draw rod.

In considering the competitive situation, it is apparent that the worst price cutting occurred in 1955 and the current year. Certainly Alcoa was not the instigator and our own margin reports indicate that prices at which we were forced to take certain pieces of business were not at all satisfactory.

W. B. Howard.

WBH:af
Attachments

Central Cable Company
Jersey Shore, Pa.

	1957 (Jan.-June)		1956		1955	
	Pounds	Dollars	Pounds	Dollars	Pounds	Dollars
Pig.....						
Rod and Bar.....	558,175	185,872	200,000	48,000	220,000	49,500
Toll Rod and Bar.....			2,538,703	803,702	1,514,788	423,444
Cable.....			200,401	16,032	220,199	13,620
Cable Acces., Aluminum.....	2,037	1,405	4,673	3,413	2,467	1,607
Cable Acces., Non Aluminum Shipping Containers						
Total.....	560,212#	\$187,277	2,734,376#	\$871,147	1,737,255#	\$488,231
	1954		1953		1952	
	Pounds	Dollars	Pounds	Dollars	Pounds	Dollars
Pig.....						
Rod and Bar.....	1,411,930	375,214	1,166,834	305,387	565,289	137,485
Toll Rod and Bar.....						
Cable.....	17,203	8,193	534,538	224,215	179,392	70,236
Cable Acces., Aluminum.....	3,169	1,739	343	145		
Cable Acces., Non Aluminum.....	5,905	855	222	28		
Shipping Containers.....	80(Cr)	1,761 (Cr)	7	382	69	1,242
Total.....	1,432,302#	\$383,940	1,701,715#	\$530,157	744,681#	\$208,963
	1951		1950		1949	
	Pounds	Dollars	Pounds	Dollars	Pounds	Dollars
Pig.....						
Rod and Bar.....			144,321	34,637		
Toll Rod and Bar.....						
Cable.....			192,298	70,010		
Cable Acces., Aluminum.....						
Cable Acces., Non Aluminum.....						
Shipping Containers.....			127(Cr)	1,777 (Cr)		
Total.....			333,619#	\$102,870		

August 22, 1957

[fol. 5415]

Estimated Spread Between E.C. Grade Re-Draw Rod

ACSR Scheduled and Competitive Prices
(Composite Conductor)

Year (Average)	E.C. Re-Draw	ACSR (Scheduled Prices)	Spread	ACSR (Competitive Situation)	Spread
1948	21.75	22.62	.87		
1949	22.50	23.22	.72		
1950	23.00	25.05	2.05		
1951	24.60	25.63	1.63		
1952	25.20	27.44	2.24	26.76	1.56
1953	26.20	28.74	2.54	28.57	2.37
1954	27.00	29.12	2.12	27.34	.34
1955	28.75	31.48	2.73	27.76	(.99)
1956	31.93	34.90	2.97	32.45	.52
1957	34.60	37.13	2.53	32.72	(1.88)

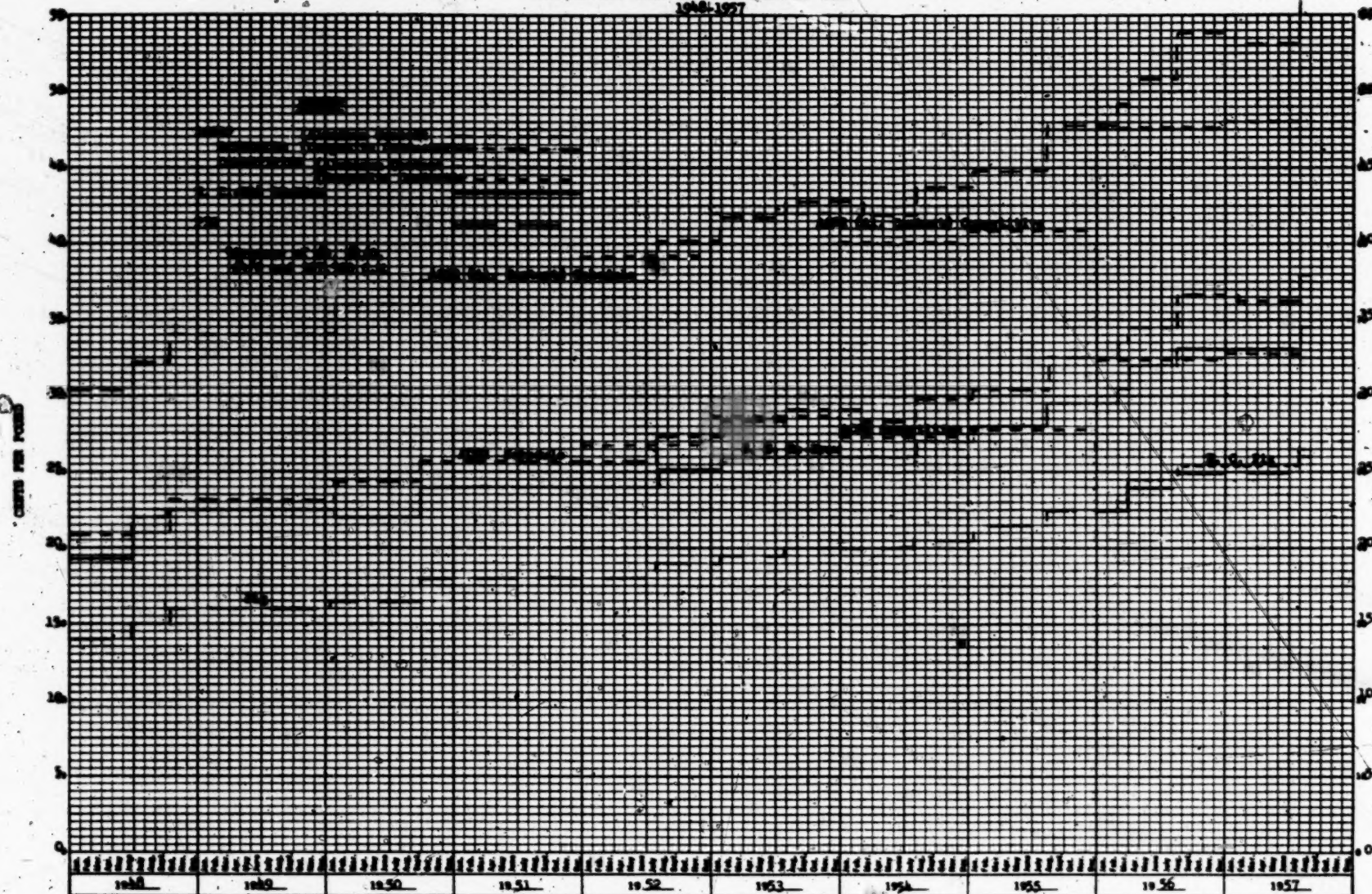
[fol. 5416]

Estimated Spread Between E.C. Grade Re-Draw Rod

ACSR Scheduled and Competitive Prices
(Aluminum Content Only)

Year (Average)	E.C. Re-Draw	ACSR (Scheduled Prices)	Spread	ACSR (Competitive Situation)	Spread
1948	21.75	33.24	11.49		
1949	22.50	34.13	11.63		
1950	23.00	36.83	13.83		
1951	24.00	37.68	13.68		
1952	25.20	40.34	15.14	39.33	14.13
1953	26.20	42.24	16.04	42.00	15.80
1954	27.00	42.79	15.79	40.18	13.18
1955	28.75	46.27	17.52	40.80	12.05
1956	31.93	51.30	19.37	47.70	15.77
1957	34.60	54.57	19.97	48.10	13.50

COMPARATIVE PRICES
ALUMINUM PPS E.C. GRADE HS-BRAN ROD ACOR
1950-1957



August 22, 1957

[fol. 5418] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 193

This Copy for: Mr. D. Wilmot

September 24, 1957

L. P. Favorite
Pittsburgh Office
Mr. R. C. Erickson
Pittsburgh Office

Re: Central Cable Corporation

This will refer to your letter of September 19, with reference to shipments of E.C. Redraw Rod and E.C. Pig. I am listing below our shipments of E.C. Pig to cable manufacturers for the year 1956 and the first eight months of 1957, also our estimated total requirements of these customers, Alcoa's participation and our best guess as to the percentages supplied by competitors.

(Thousands of Pounds)		Alcoa Shipments		Total Requirements		1957 Estimate by Sales Office	
Dist.	Customer	Year 1956	8 Mo. 1957	Total	Alcoa Share	Alcoa Participation	Per cent
Al.	Rome Cable	3,175	1,115	3,600	2,000	(Alcoa	—60%
						(Alcan	—20%
						(Kaiser	—20%
At.	Southwire Co.	2,066	240	15,000	500	(Alcoa	—3%
						(Alcan	—40%
						(Kaiser	—25%
						(Reynolds	—25%
						(Anaconda	—7%
At.	Southern Electrical Company	2,976	2,579	13,400	6,600	(Alcoa	—50%
						(Alcan	—45%
						(Kaiser	—5%
Ch.	Essex Wire Corp.	1,051	252	*6,000	300	(Alcoa	—5%
						(Alcan	—58%
						(Kaiser	—17%
						(Reynolds	—20%
NY	General Cable	4,792	4,349	7,500	6,000	(Alcoa	—80%
						(Alcan	—10%
						(Kaiser	—10%
Totals		14,060	8,535	45,500	15,400		

* From 1957 Sales Aid.

[fol. 5419] In my letter of September 5, addressed to Mr. R. B. McKee, I listed our shipments of E.C. Redraw Rod to our customers who produce cable. During 1956, the in-

dustry shipped 187,356,000 pounds (net aluminum weight) of ACSR and bare cable. During the same period, Alcoa shipped 55,607,000 pounds leaving a balance of 131,749,000 pounds shipped by competitors. Using this latter figure, the 18,849,000 pounds of E.C. Redraw Rod mentioned in my letter of September 5, as being shipped to this group of competitors, would show that our percentage of E.C. Redraw Rod shipped to customers amounted to 14.35%. On the same basis, we would estimate that Kaiser shipped about 7% or 9,000,000 pounds and Reynolds about $2\frac{1}{2}\%$ or 2,600,000 pounds. This, of course, is not the true picture as to how much metal Alcoa furnished to the industry, because we should add the amount of E.C. Pig that was shipped to customers who make cable. During 1956, the total amount of E.C. Pig and E.C. Redraw Rod shipped to these customers totaled 32,909,000 pounds. So on this basis, and using the figure 131,749,000 pounds as the total tonnage of cable shipped by this group of customers, we supplied 25%.

Considering the fact that we shipped 55,607,000 pounds of cable which added to the E.C. Rod and E.C. Pig would total 88,516,000 pounds and considering the fact that a total of 187,356,000 pounds was shipped by the entire industry, we then supplied 47% of the total metal. I want to caution you that this is a figure you should not use, because we know that some of the E.C. Redraw Rod and E.C. Pig we ship to customers goes into the manufacture of E.C. Bare and Covered Wire, which is not a part of the cable situation. [fol. 5420] Using the Bureau of Census figures of shipments for 1956, which cover E.C. Wire, Covered Wire and Cable, the industry shipped 250,000,000 pounds. Using the figure of 88,516,000 pounds as the total amount of metal supplied by Alcoa, we then arrive at a total percentage participation of 35%. If we use the Bureau of Census figure of total shipments of 250,000,000 pounds and subtract our shipments of cable 55,607,000 pounds, we arrive at a figure of 194,400,000 pounds of products produced by our competitors using E.C. Pig or Redraw Rod. Using this figure, as compared to the E.C. Pig and E.C. Redraw Rod shipped to this group of customers, we arrive at a participation of only 17%.

There are many ways that these figures can be used to arrive at certain percentages, but I believe that the examples

which I have listed above will serve your purpose. It is rather difficult to arrive at any definite set of figures which can be checked with the Bureau of Census figures published in Washington. These figures include E.C. Wire, Covered Wire and Cable, but I believe that facts, as listed above, are more or less in line with the data that you requested. If I can be of any further assistance, please let me know.

L. P. Favorite.

LPF :jk

CC: Mr. R. V. Davies, Mr. L. E. Hickman, Mr. R. B. McKee, Mr. D. Wilmot, Mr. L. C. Fisher, Philadelphia.

A	Total and Shipt.	187.3
B	Alcoa	55.6
C	All others	131.7
D	Alcoa Shipt. to Feb.	32.9
E	%—D of C	25.
F	Total and Bare & Covered	250
		55
		195

$$\frac{329}{195} = 17\%$$

[fol. 5421] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 194

October 11, 1957.

Accounting Department
Cost Division
Pittsburgh Office
Mr. P. T. Coffin
Pittsburgh Office

Re: Spread in Schedule Base Price Between E. C. Redraw Rod and Bare Cable

Attached hereto are two tables containing data regarding E. C. redraw rod and bare cable schedule prices which may be of interest.

J. L. Healy.

JLH:hew
Attachments

CC: Mr. D. B. Miller, Pittsburgh

Table I
Estimated Competitors' Margin on Cable

Manufacturer Assuming Purchase of Redraw Rod, Sale of Scrap at Market Price,
Sale of Cable at Alcoa Schedule Price and Assuming Alcoa's Costs
(Per Composite Pound)

	# 1/0 6/1 ACSR	# 4 7/1 ACSR	795,000 CM 26/7 ACSR	900,000 CM 54/7 ACSR	336,400 CM 19 All Alum.	795,000 CM 37 All Alum.
Alcoa Price Schedule Dated 8-1-57	\$ 3663	\$ 3731	\$ 3679	\$ 3840	\$ 4510	\$ 4252
Cost						
Redraw Rod Cost @ \$346	261	223	263	281	384	384
Scrap Credit @ \$.18	013 cr	013 cr	013 cr	014 cr	019 cr	019 cr
Wire Drawing	004	008	003	005	007	005
Stranding	009	021	005	009	015	007
Steel	059	078	060	051	013	013
Packing and Shipping	013	013	013	013	019	019
Transportation	019	019	019	019	019	019
Plant Administrative Expense and Unabsorbed Burden	012	016	011	013	017	013
Total Cost Excluding G.A. & S.E.	364	365	361	377	436	422
Competitors Margin Before Allowance for C.A. & S.E.	0023	0081	0069	0070	0150	0032
Alcoa Price Schedule Dated 10-7-57	3363	3431	3379	3540	4110	3852
Total Cost Excluding G.A. & S.E.	364	365	361	377	436	422
Competitors Margin Before Allowance for G.A. & S.E.	0277 (loss)	0219 (loss)	0231 (loss)	0230 (loss)	0250 (loss)	0308 (loss)

* Note: Alcoa's plant administrative expense includes substantial expenditures for metallurgical and industrial engineering and other technical services, a relatively small portion of which would be incurred by the non-integrated competitor. Likewise, Alcoa's unabsorbed burden includes certain elements of cost which the non-integrated producer would not incur. We have no way of knowing what a competitor's general administrative and selling expense would be and therefore have not attempted to estimate this item. However, the competitor undoubtedly does not sustain the extensive programs Alcoa does for advertising, research, etc. and therefore his general administrative and selling expenses would reasonably be expected to be much lower than Alcoa's. Considering these factors and after making due allowance for the competitor's general administrative and selling expense (Table I does not include provision for the competitor's G.A. & S.E.) it is quite probable that Alcoa's schedule prices, based on price schedules dated 8-1-57, for E.C. redraw rod and cable permit the non-integrated producer to make a profit.

{fol. 5423}

TABLE II
CHANGES IN BASE PRICE OF E.C. REDRAW ROD AND
SELECTED CABLE SIZES FROM JULY 22, 1946 TO DATE AND
COMPARISON OF SPREAD BETWEEN THESE PRODUCTS DURING SAME PERIOD

		Date of Price Change (2)																					
		7-22-46	12-10-46	7-25-47	6-21-48	10-11-48	1-27-50	2-22-50	10-1-50	3-1-52	1-23-53	7-27-53	3-3-54	6-9-54	1-13-55	8-11-55	2-2-56	3-2-56	6-10-56	2-1-57	6-1-57	10-7-57	
Base Price Per Aluminum Pound																							
E.C.-M12 and M14 Redraw Rod		.185	.190	.194	.210	.225	.220		.240	.252	.242			.270	.280	.295	.305	.320	.333	.353	.340	.340	
Cable																							
1/0 6/1 A.C.S.R.		.290(1)	.295(1)	.310(1)	.329(1)	.346(1)	.345		.359	.387	.400	.411	.402	.420	.430	.451	.475	.490	.520	.525	.539	.493	
4 7/1 A.C.S.R.		.327(1)	.332(1)	.373(1)	.394(1)	.414(1)	.414		.439	.461	.476	.493	.484	.505	.515	.551	.585	.582	.610	.611	.642	.591	
795,000 2 5/7 A.C.S.R.		.283(1)	.299(1)	.319(1)	.334(1)	.351(1)	.350		.374	.393	.405	.410	.401	.413	.429	.459	.474	.489	.510	.513	.535	.493	
900,000 5 4/7 A.C.S.R.		.231(1)	.251(1)	.297(1)	.325(1)	.342(1)	.340		.365	.383	.395	.400	.392	.410	.419	.440	.463	.476	.505	.502	.524	.483	
330,400 19 All Alum.		.265(1)	.265(1)	.271(1)	.291(1)	.300(1)	.303		.316	.332	.345	.345	.342	.357	.357	.390	.405	.420	.442	.441	.461	.411	
795,000 37 All Alum.		.261(1)	.262(1)	.267(1)	.266(1)	.261(1)	.277		.301	.317	.329	.330	.327	.342	.352	.375	.390	.405	.420	.425	.425	.385	
Arithmetic Average		.205(1)	.201(1)	.304(1)	.323(1)	.340(1)	.333		.351	.379	.392	.390	.391	.409	.419	.447	.462	.477	.505	.501	.520	.475	
Spread in Base Price																							
Redraw Rod to Cable (3)		.100	.101	.110	.113	.115	.118	.118	.121	.127	.130	.136	.129	.139	.139	.152	.157	.157	.172	.166	.174	.130	

- (1) Prior to 1-27-50 there was no transportation allowance on cable, therefore, \$.0135 per composite pound has been added to the price schedule indicated to adjust for the present full transportation allowance basis.
- (2) These are the exact dates of the cable price changes. In some cases the pig and redraw price changes vary from these dates by a few days.
- (3) The spread between redraw and cable is based on the difference between the redraw price and the arithmetic average of the cable prices shown above.

[fol. 5424] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 195

January 25, 1955.

Robert P. Miller
York Office
Mr. D. B. Miller
Pittsburgh Office.

Re: Central Cable Corporation, Jersey Shore, Pa.

In a telephone conversation with Mr. M. C. Harris, Vice President of the captioned today, he stated that he had reason to believe that large users of redraw rod were getting special prices by placing orders for six months requirements. He feels that since they are a good customer they should also have some consideration. I frankly feel that he is misinformed.

To my knowledge, there is no competitive situation at Central Cable regarding prices. They will not have anything to do with Reynolds' redraw and, at last report, the drawing qualities of Kaiser's rod was inferior to ours. I am sure that if either of these two competitors were offering a cheaper rod they would give him some, if not all, of their business. I thought you might be interested in knowing about this, however, and if you have any comments, I would appreciate receiving them.

Robert P. Miller.

RPM MLB

cc: Mr. P. T. Coffin, Pgh., Mr. G. R. Gent, Pgh., Mr. L. C. Fisher, Phila.

[fol. 5425] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 196

January 27, 1955.

Robert P. Miller
York Office
Mr. D. B. Miller
Pittsburgh Office

Re: Central Cable Corporation, Jersey Shore, Pa.

This supplements my letter to you of January 25th regarding the captioned's request for a lower price on his redraw rod requirements.

Attached hereto you will find a letter received today from the captioned, formally requesting a price on their redraw rod requirements for the first half of 1955. We, of course, will make no reply to this letter, nor discuss the situation with the customer until hearing from you. I assume that this same letter was sent to both Reynolds and Kaiser, but I repeat that the customer claims he prefers our product because he does not have faith in the Reynolds method of fabrication nor does the Kaiser rod draw as readily as ours does.

Robert P. Miller.

RPM MLB

cc: Mr. P. T. Coffin, Pgh., Mr. L. C. Fisher, Phila.
Attach.

[fol. 5426] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 197

Copy for Mr. A. R. Gneiser, York

February 23, 1955.

L. C. Fisher
Philadelphia Office
Mr. David B. Miller
Pittsburgh Office

Re: Central Cable Corporation

With reference to Bob Miller's letter of January 25 and your letter of February 4 to Al Gneiser, Messrs. J. G. Detwiler and M. C. Harris called upon Mr. Coffin Tuesday, February 21, ostensibly to talk about our agency agreement on conductor accessories. The subject of redraw rod was brought up during the conversation and in your absence Mr. Coffin did a masterly job of explaining the Company's views regarding the sale of this product to cable stranders.

Mr. Detwiler was informed quite firmly that our margin on redraw rod is too low to permit consideration of any reduction in selling price. Mr. Detwiler was not happy, as you can imagine. He indicated that his purchase probably will be considerably reduced during the first six months of 1955 due to the fact that his competitors have accepted a great deal of cable business at prices below his permissible selling prices. He reiterated his intention to purchase Alcoa rod, however. This is due to the fact that the utilities express a preference for cable fabricated from Alcoa raw material plus the fact that his own experience with directly cast rod has been unsatisfactory. He purchased 50,000 lbs. of rod from Southwire only to find that its drawing characteristics are poor, apparently caused by inclusions.

[fol. 5427] Mr. Harris and I had a brief conversation earlier regarding rod prices, during which I gave him essentially the same information about our rod prices. He insisted that Central Cable has been offered lower prices by our competitors and demanded to know whether we will meet such prices. He tried to infer that Kaiser was quoting \$.01 off our price, but did not say this directly. I told him

that redraw rod is not as profitable as many other products and under present circumstances there appears to be no advantage to reducing prices. I do not believe that Kaiser has offered a lower price but will ask Bob Miller and Al Gneiser to keep in close touch with these people in case such an offer develops, at which time we will discuss the subject further with you.

Central Cable are ordering the stranded items they do not produce from Southwire at present which has eliminated us from a substantial amount of cable business. Southwire apparently is allowing them more discount than our 5%.

At the close of our various conversations Bob Miller and I told Messrs. Harris and Detwiler separately that we are very much interested in their rod business and we will do everything in our power to provide the best possible quality and service. Furthermore, we will get in touch with them immediately if there is any change in redraw rod prices. They were assured that their price will be as low as prices offered to anyone else in their particular line of business. [fol. 5428] Mr. Detwiler certainly will be casting around to find some means of saving money on redraw rod and we will continue to keep in close touch with him so that you can be informed at all times.

L. C. Fisher.

LCF/ac

cc—Mr. P. T. Coffin, Pittsburgh, Mr. A. R. Gneiser, York.

[fol. 5429] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 198

CC: H. T. Dyett

A. D. R. Fraser
G. E. Rolston
G. A. Weiss

August 5, 1955.

Mr. R. Murray Willard
District Sales Manager
Aluminum Company of America
90 State Street
Albany 7, New York

Dear Jess:

In your letter of August 2nd you state that it is necessary to increase the prices on the products which we purchase from you. The advance without protection which you are forced to make is understandable, and we can see the need for the revision as you cannot be expected to absorb the wage increases as well as the greater cost of materials and services. Although we are in complete agreement with your policy in charging us more for our aluminum pig, we cannot understand your pricing policies in regard to cable as stated in your price sheets dated June 27, 1955. The policy to which I refer is as follows:

"The prices stated herein for materials covered hereby shall be firm for a period of 240 days from date of Alcoa's acknowledgment of order, after which they shall be adjusted to and the materials shall be invoiced at Alcoa's prices in effect at time of shipment except that any increases in prices shall not exceed those stated herein by more than 5% within one year from date of Alcoa's acknowledgment of order or by more than an additional 5% within each succeeding year."

As you know, Alcoa is our only source at present for aluminum pig. Consequently, effective immediately we are forced to pay a higher price for the aluminum we purchase, but at the same time in meeting competition the product we sell has a practical ceiling for 240 days based on price of

aluminum in effect prior to August. This makes us feel a little like Cinderella. Unfortunately we have no Prince Charming. What's the answer?

Although we are most unhappy in this middle position, we should enjoy having you come to Rome for that golf game—provided you will play for pennies rather than the dimes we no longer can afford.

Very truly yours, Rome Cable Corporation, —,
—, Executive Vice President.

JHD:AF

[fol. 5430] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 199

February 6, 1957.

Accounting Department
Cost Division
Pittsburgh Office
Mr. D. B. Miller
Pittsburgh Office

Wire Rod Bar File 1121

Re: Electrical Conductor Cable and Redraw Rod Prices

Please refer to our conversation of this morning regarding the spread between E.C. redraw and cable prices.

On February 28, 1956 the price of E.C. pig was increased \$.005 per pound, E.C. redraw rod was increased \$.010 per pound and cable was increased \$.015 per aluminum pound. As a result of these increases, the spread between E.C. redraw rod and cable was increased \$.005 per pound.

On August 10, 1956 cable prices were increased \$.006 per aluminum pound over the metal, labor and steel cost increases which occurred at that time. This \$.006 per pound was intended to cover increased costs and reduced revenue resulting from an increase of 2½% in distributors discount and the elimination of quantity extras. It appears probable that this amount was considerably more than needed, with the result that the spread between redraw rod and cable may have been widened on August 10th.

The proposed reduction in published cable prices to the 3-29-56 price plus 5% will result in an average decrease of \$.004 per aluminum pound. Thus, we can absorb this reduction without decreasing the price of redraw and still have a greater spread between redraw and cable (by \$.001 per pound or more) than existed before 2-28-56.

If you would like additional data, please advise.

J. L. Healy.

JLH:hew

CC: Mr. P. T. Coffin, Pittsburgh.

[fol. 5431] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 200

September 19, 1957.

Mr. Leon E. Hickman
R. C. Erickson
Pittsburgh Office
Mr. L. P. Favorite
Pittsburgh Office

Re: Central Cable Corporation

Mr. L. E. Hickman has requested that I analyze Mr. R. B. McKee's memorandum of August 29, 1957, and your memorandum of September 5, 1957, regarding the above-captioned subject.

If consideration is given to establishing a commodity price on E. C. redraw rod and establishing firm prices therefor on a basis similar to that currently charged for cable, the effect thereof on the customers for E. C. pig must also be studied. Accordingly, it is requested that you advise me as to the sales of E. C. pig during the same periods, namely, 1956 and the first seven months of 1957, limiting such statistics, if you desire, to the total number of customers and the total amount of pig sold and identifying only the major customers with the respective purchases of each. In addition, if you can advise of the extent to which customers purchase standard pig and perform the

alloying operations themselves, such information will be most helpful in analyzing this problem. Likewise, if you could give me some idea of the percentage of the market held by Alcoa in the sale of E. C. redraw rod and the sale of E. C. pig, and also of the percentages of the market held by each of the other two major producers, such information will be most helpful.

R. C. Erickson.

RCE:pmb

cc: Mr. L. E. Hickman, Mr. R. B. McKee, Mr. R. V. Davies,
Mr. D. Wilmot, Mr. L. C. Fisher, Philadelphia.

[fol. 5432] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 201

Internal Correspondence

October 15, 1959

From: Alfred R. Gneiser
York Office
To: Mr. D. B. Miller
Pittsburgh Office.

Re: Central Cable Corporation Jersey Shore, Penna.

When I was in Pittsburgh I told you and others about Mr. Jack Detwiler's offer to purchase 25,000,000 Lbs. of E.C. Redraw from us over the next five years if we could guarantee today's price of \$.287 per pound. In return he promised to write a contract with us in which the amount to be taken out would be absolutely firm. When I indicated that we could not write a long term contract without an escalation clause Mr. Detwiler said he might be interested in a one-year deal at today's price. We believe these offers were also going to be made to other suppliers if such had not already been done.

Central Cable claim they are interested only in 62% conductivity and so would not use Properzi stock. We seem to feel they are now getting some of their requirements from Kaiser and the balance from abroad. The

imported coils are one piece spool wound of about 3,000 Lb. weight and Central Cable like them because they eliminate welding and take up much less warehouse space.

We here would be inclined to gamble a bit to get this outfit back in the fold,—they haven't favored us with any business for almost two years—but if a one year firm contract is not in the cards it is felt that we might be able to interest Central Cable in a five year contract tied to the existing price of E.C. Pig. Mr. Detwiler, in effect, buys [fol. 5433] his copper rod on a somewhat similar basis and could well be inclined to look favorably on a like schedule for aluminum.

The build-up of our price today on this Redraw is as follows:

E.C. Pig	Plus Toll Fab. =	E.C. Redraw Price
\$.252	\$.035	\$.287 per Lb.

Subsequent prices would be made up of the then prevailing Pig price plus toll plus maybe a definite maximum escalation on this fabricating differential not to exceed a certain percentage in any one year.

25,000,000 Lbs. is a lot of aluminum and we would like to book it. Central, of course, want some sort of protection in exchange for a firm commitment in this large amount. It is our hope that the above price formula could be made interesting to you. We would like to approach Mr. Detwiler with a proposition if you will fill in the escalation details.

May we suggest a very thorough investigation of the matter. Perhaps some kind of an overall program might be formulated to permit of writing a mutually agreeable contract with other independent wire fabricators as well as Central Cable.

Alfred R. Gneiser.

ARG MH

cc—Mr. R. B. McKee, Pittsburgh, Mr. L. P. Favorite, Pittsburgh, Mr. H. T. Wilder, Pittsburgh, Mr. S. J. Simmons, Pittsburgh, Mr. W. T. Mitman, Pittsburgh, Mr. G. H. Weiss, Pittsburgh, Philadelphia Office.

2256

[fol. 5434] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 202

October 20, 1959.

David B. Miller
Pittsburgh Office
Mr. A. R. Gneiser
York Office

Re: Central Cable Corporation Jersey Shore Pennsylvania

Your letter dated October 15th under the above caption has been given very careful consideration, and I regret to report that our answer is still the same as that which we gave you when you discussed the matter on a recent visit to Pittsburgh.

As anxious as we are to secure all the business which we can possibly book, there are too many ramifications to this situation to permit us to offer anything other than a supply contract on the basis of price current on date of shipment.

David B. Miller.

DBM BS

CC: Messrs. R. B. McKee, Pittsburgh, L. P. Favorite, Pittsburgh, H. T. Wilder, Pittsburgh, S. J. Simmons, Pittsburgh, W. T. Mitman, Pittsburgh, G. H. Weiss, Pittsburgh.

[fol. 5435] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 203

Copy for Mr. E. W. Beggs
Internal Correspondence

February 7, 1957.

From: G. V. Craighead
Buffalo Office
To: Mr. P. T. Coffin
Pittsburgh Office

Re: Westinghouse Electric Corporation, Buffalo, New York

On January 31 Messrs. Baker, Beggs, and myself met with certain Westinghouse people to discuss further their interest in toll fabricating aluminum magnet wire for Alcoa. Those in attendance from Westinghouse were:

Mr. C. W. Parezo, Director of Purchases
Mr. W. G. Miller, Manager, Wire Department
Mr. W. E. Burden, Non-ferrous Buyer

We briefly reviewed what we had already brought out in previous meetings about the unrealistic pricing of aluminum magnet wire by those in the coated copper end of this business. We further pointed out that we had several large customers who had already come to us and who had shown interest in re-designing their product for aluminum and using several million pounds of aluminum magnet wire annually if a reasonable savings over copper could be shown. Our contention was that actual economies did exist in the use of aluminum over copper and that these should be realistically translated into prices of the aluminum product.

Mr. W. G. Miller reacted quite favorably and in the very short time he had to prepare figures, he conservatively estimated that today they have at least 75,000 lbs. aluminum [fol. 5436] capacity per month available for covering the below sizes:

Quantity	Wire Size Diameter
50,000 lbs.	28-045
15,000 lbs.	010-0254
10,000 lbs.	144 and larger

The customer's towers are presently set up to use Bondar which is a Westinghouse coating similar to Formvar. It was pointed out, however, that their towers could be changed over to Formvar, if necessary, with very little capital outlay. Mr. Miller further mentioned that additional tower capacity could be made available using their present equipment. It would also be possible, he felt, to install new towers in order to take care of the business. Mr. Burden's questioning was mostly concerned with what level we would attempt to price aluminum magnet wire and whether it would be related to the copper market. We did everything possible to discourage any such pricing of aluminum on the basis of copper. All of us feel that Westinghouse will give us prices on the above sizes, based on their actual costs and including a profit with no unknown factors.

We asked that Westinghouse give us some toll figures on the basis of Alcoa furnishing them with:

1. Redraw rod.
2. Final size wire, 20-25 gage
3. Intermediate wire size, perhaps .189

With Westinghouse's present, although limited, facilities for drawing aluminum wire we are particularly interested in figures on (2) above. The next move is up to Westinghouse who plan to come through with some pricing information very shortly. Should you wish, we could set up a meeting either in Buffalo or Pittsburgh with certain of their top people to discuss this.

[fol. 5437] In the way of sidelights, their Mr. Miller is extremely interested and is the type of person who will make a program like this work. He is the one who has been wielding the big stick at Lima and the fact that Lima has experienced excess breakage during automatic winding doesn't discourage him in the least.

In the interim, Alcoa will have to be thinking about whether Bondar would be acceptable in lieu of Formvar. Mr. E. W. Beggs plans to get technical information on Bondar and, very shortly, will relay it to you.

Another thing we will have to think about is the type of package Alcoa might like for the finished product, i.e. spools, returnable or nonreturnable, or possibly the pail

pack. Then there is the matter of other insulation such as glass or, perhaps, cotton.

I think we are off to a good start at Westinghouse; certainly they are an extremely cooperative lot. Our contacts there are good and we stand ready to move this along just as fast as we are permitted.

G. V. Craighead

gvc:el

cc: Mr. R. S. Baker, Syracuse, Mr. E. W. Beggs, Buffalo,
Mr. R. R. Cope, New Kensington.

[fol. 5438] ° IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 210

February 20, 1958

Philip T. Coffin
Pittsburgh Office
Mr. R. R. Cope
New Kensington

Re: REA Magnet Wire Company

I am not sure that I discussed with you the background of Paragraph 4 of Mr. Davies' letter to Bob Whearley. Only the slightest reference was made to the matter when you and I were in Fort Wayne, but it could be quite important.

If we wish to cover the entire field in magnet wire, as I think we should, it will, of course, be necessary for us to be in a position to furnish material such as previously described in numbered paragraph 4. Rea does not have the equipment to make this, but Rome does; and if during my absence you have occasion to discuss the point, as you probably will, I think you should make it quite clear to Rea Magnet that because of our long standing tie-up with Rome we would probably owe first allegiance to them with respect to these particular types of magnet windings. If Rea's reaction is what I think it will be, they will shrug their shoulders and say that they had no intention of getting

into that field now. If, on the other hand, they take the position that they would like to install the necessary equipment and round out their line, then we will be confronted with making a choice between Rea and Rome; and presumably we would have to fall back on Mr. R. V. Davies for both an opinion and probably help.

PTC:ags

Philip T. Coffin

[fol. 5439] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 221

Internal Correspondence

October 1, 1958.

From: R. R. Cope

Pittsburgh Office

To: District Sales Office Managers

Re: Alcoa Aluminum Magnet Wire

In presentations to the sales offices concerning strip and foil windings, we have indicated that there is a potential market for insulated aluminum magnet wire, particularly in the appliance motor field. We also indicated that magnet wire producers have never established realistic prices so aluminum could be competitive with copper. This was true even when copper was as high as 50 cents a pound.

Alcoa has entered into an agreement with Rea Magnet Wire Company, Inc., Fort Wayne, Indiana, to manufacture aluminum magnet wire as an Alcoa product and to sell it as an agent of Alcoa. Rea is a leading independent producer of magnet wire and has pioneered several innovations which are today commonplace in the magnet wire industry.

Realistic prices have been established by Alcoa for the first time, giving cost savings over copper magnet wire of from 6 to 14 per cent for equivalent conductivity.

The Alcoa product will utilize three different types of insulation for the most part, and be available in either single or heavy coatings. Formvar, Nyform and Isonel

(polyester) are the three types of insulation. Formvar and Nyform are Class A insulations. Isonel (polyester) is a Class B and F insulation, capable of operation at 155°C. (The attached material provides this information in more detail.) The size range will be from 12 through 24 gauge. The attached price sheet will prevail. All the types of insulation are priced the same.

" The product will be available on spools or in pails or drums as shown in the attached price list, and will carry the Alcoa label.

[fol. 5440] This new product will give us an opportunity to recommend either round insulated magnet wire or strip as a means of fabricating a particular electrical device.

We ask that you make a real attempt in your contacts with electrical manufacturers to generate interest in this new product, sending any inquiries to Mr. Joseph C. Coyne, Fort Wayne Sales Office, by *teletype* since Rea tells us that the success of the sale of magnet wire is, to a large degree, dependent upon fast action. Under our agreement with Rea, you may actually accept orders for aluminum magnet wire if circumstances indicate the advisability of such action. Normally we should try to place the business through Rea.

We have a decided jump on our competitors in having a quality product, priced to reflect the actual savings available with aluminum. Timing is important. Please make every effort to contact likely prospects. You may be contacted by some of the Rea sales people on problems such as joining; I am sure you will cooperate with them. Attached also is a list of the Rea sales organization.

R. R. Cope.

RRC:BJH

cc: Mr. D. Whitmot, Mr. I. W. Wilson, Mr. F. L. Magee, Mr. R. V. Davies, Mr. R. B. McKee, Mr. F. J. Close, Mr. W. S. McChesney, Mr. J. D. Harper, Mr. G. R. Stout, Vancouver, Mr. N. B. Lane, Massena, Mr. K. R. Van Horn, ARL, Mr. A. B. Wilber, New Kensington, Mr. H. H. Caldwell, New Kensington, Mr. S. R. Chapman, New Kensington, Assistant District Managers, Branch Office Managers, Resident Managers, Industry Managers, Product Managers, Assistant Product Managers, Chief Administrators, Foil Salesmen, Electrical Conductor Salesmen.

[fol. 5441]

Comparison of Bare Copper and Al. Magnet Wire

Avg Size	Nom. Bare Dia.	Lbs./1000 Feet		Feet/Lb.		Ohms/1000 Feet		Ohms/Lb.	
		Cu.	Al.	Cu.	Al.	Cu.	Al.	Cu.	Al.
10	1019	31.43	9.556	31.82	104.6	.9988	1.616	.0318	.1691
11	0907	24.9	7.57	40.2	132	1.261	2.04	.0506	.269
12	0808	19.8	6.01	50.6	166	1.589	2.57	.0804	.428
13	0720	15.7	4.77	63.7	210	2.001	3.24	.127	.679
14	0641	12.4	3.78	80.4	264	2.524	4.08	.203	1.08
15	0571	9.87	3.00	10	333	3.181	5.15	.322	1.72
16	0508	7.81	2.38	128	421	4.019	6.50	.514	2.74
17	0453	6.21	1.89	161	529	5.054	8.18	.814	4.33
18	0403	4.92	1.49	203	669	6.386	10.3	1.30	6.91
19	0359	3.90	1.19	256	843	8.047	13.0	2.06	11.0
20	0320	3.10	.942	323	1060	10.1	16.4	3.27	17.4
21	0285	2.46	.748	407	1340	12.8	20.7	5.19	27.6
22	0253	1.94	.589	516	1700	16.2	26.2	8.36	44.5
23	0226	1.55	.470	647	2130	20.3	32.9	13.1	69.9
24	0201	1.22	.372	818	2690	25.7	41.5	21.0	112
25	0179	.970	.295	1030	3390	32.4	52.4	33.4	178
26	0159	.765	.233	1310	4300	41.0	66.4	53.6	285

[fol. 5442]

REA Sales Districts

September 11, 1958

Indiana-Michigan-Kentucky District

R. H. McCampbell,
3610 E. Pontiac Street,
Fort Wayne, Indiana,
Anthony 5202.

Ohio-Western Pennsylvania District

Ivan J. Barclay,
3610 E. Pontiac Street,
Fort Wayne, Indiana,
Anthony 5202.

Chicago District

Robert J. Slater,
Larry Whearley,
4808 N. LaVergne Avenue
Chicago 30, Illinois,
Avenue 3-2608 or 3-2609.

New England District

John V. Muddle,
74 Union Street,

Ashland, Massachusetts,
Telephone: Framingham, Mass.
TRinity 3-7091.

California District

George R. Croft,
2837 W. Pico Boulevard
Los Angeles 6, California,
Republic 1-8211.

Southeastern District

G. Lloyd Schoen,
Electrical Insulation Suppliers, Inc.,
500 Means Street, N. W.
Atlanta, Georgia,
Jackson 5-2707.

Minnesota District

O. J. Lenmark,
610 Plymouth Building,
Minneapolis 2, Minnesota,
FEderal 3-3388.

St. Louis District

Leonard R. Oser,
301 Siteman Building,
111 S. Bemiston Avenue,
St. Louis, Missouri,
Volumteer 1-6455.

Kansas District

Charles H. Funk,
220 South Robin Road,
Wichita, Kansas,
WHitehall 3-0237.

Oklahoma-Arkansas District

John H. Cole Company,
(Motor Repair Shops),
1825 West Main Street,
Oklahoma City 2, Oklahoma,
CEntral 2-3171.

Eastern District

**R. E. (Dick) Clayton,
F. X. O'Connell,
Highway 22 & County Line Road,
Somerville, New Jersey,
Mailing Address: P. O. Box 529,
Telephones:
Somerville—RAndolph 2-2300,
New York—WHitehall 3-4737.**

Wisconsin District

**E. C. Winkenwerder,
4808 N. LaVergne Avenue,
Chicago 30, Illinois,
PEnsacola 6-1332.**

Texas District

**Seco Electric Supply Company,
Mr. Ike Wynn,
Grand and Trunk Avenues,
Dallas, Texas,
HAmilton 8-2116.**

[fol. 5443] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 223

Internal Correspondence

July 30, 1959.

From: L. E. Hickman
Philip T. Coffin, Pittsburgh Office
To: Mr. R. V. Davies, Pittsburgh Office

Confidential

Legal

Re: Aluminum Magnet Wire

I am decidedly bullish over the future of aluminum magnet wire, particularly in the wire sizes in the general range of No. 10 through No. 30. Beyond No. 30, the tensile

strength of aluminum is such that probably wire drawing and handling difficulties would put too high a price tag on aluminum magnet wire for most ordinary uses. My reasons for the optimistic outlook with respect to aluminum magnet wire are based chiefly on one premise and that is my belief that the relative supply and demand pictures for aluminum and copper are so different. Putting it another way, I think that within the next several years copper will get up on a plateau and stay there whereas aluminum appears to be going along at a very stable price level.

There are literally thousands of everyday uses for copper magnet wire such as bell ringing transformers, solenoids and relays of every description, electric toys, electric appliances, fractional horse power motors for work shops, etc., where aluminum magnet wire could be used in many instances for very slight reductions in prices over present day copper prices and in some cases for a considerable reduction in price, all depending upon whether or not space factor is important or the relative price of the winding constituent is large in the article under consideration.

General Electric Company, for example, in its captive manufacture of aluminum magnet wire has been using the product for some seven or eight years in a number of electrical appliances and in refrigerator motors. So far as we [fol. 5444] know, they have had no trouble. G. E. has also been using aluminum magnet wire more recently in dry type distribution and lighting transformers, and some of us are puzzled why some of the General Electric competitors have not followed suit. We know that Westinghouse, in their Buffalo Works, are on the verge of going into an aluminum magnet wire program, but the price of copper has not quite reached the point of swinging the balance.

Another very large outlet for aluminum magnet wire is in the coils of television sets where space factor, particularly for the saddle coils, is not important. Light weight, on the other hand, and price are very important. Up to a short time ago, we thought that probably automobile horns were another excellent outlet for aluminum magnet wire, but Mr. Cope tells me that it appears more and more that while the future for aluminum is excellent in this direction, it will probably be in the form of strip windings rather than magnet wire. I mention this because I think I told you not long

ago that I thought automobile horns were one of the big outlets.

Rea Magnet Wire is making excellent headway in interesting manufacturers in the use of aluminum magnet wire for electronic applications and for missiles and in aircraft where light weight and operating at high temperatures are important. You are probably aware of the fact that copper, when used at elevated temperatures, oxidizes and flakes off and gives all kinds of trouble. That is one of the reasons that Westinghouse recently gave so much publicity to a process that they had purportedly developed for the coating of aluminum on the outside of copper wire. The applications of aluminum magnet wire in this field are quite diversified, and at the present time, at least, the price of satisfactory wire for these applications is of particular importance.

I think that the exploitation of aluminum magnet wire by Alcoa and others will inevitably spur on some of the other [fol. 5445] captive manufacturers such as Western Electric, for example, to also go to aluminum magnet wire, and probably some residual business would come our way as a result, and almost certainly we could get a good share of the aluminum redraw rod.

Rome Cable Corporation enjoys a nice volume of business in square and rectangular magnet wire but does not go down to the smaller so called round sizes in either copper or aluminum. I think that our pushing the aluminum magnet wire application would be a natural and valuable activity to supplement the Rome activities. Generally speaking, the same trade that the Rome salesmen call on for Rome's present magnet wire products would be the same as that for the finer wire sizes of magnet wire to which I refer.

A final reason for my being optimistic about the future of aluminum magnet wire is again a matter of purely personal judgment. It is my belief that those who get in on the ground floor on the exploitation of aluminum magnet wire will be those who reap the biggest reward, and while I do not picture by any means that aluminum will replace copper even in the majority of magnet wire applications, there will be many situations where package deals involving big and small wire, or both copper and aluminum, can

or will be made to advantage. Mr. Cope has advised me from time to time that he thinks that something like 10% of the copper magnet wire market could well be taken over by aluminum. I don't disagree with Mr. Cope except to the extent that I am somewhat more optimistic. I can foresee the possibility of perhaps invading the copper market to the extent of several times that Mr. Cope thinks. A survey by Commercial Research, as I recall it, indicated current consumption of copper in the magnet wire field approximating 500,000,000 pounds per year. Certainly after applying a 50% factor for aluminum-electrical applications, 25,000,000 pounds a year or better in a highly fabricated [fol. 5446] product such as aluminum magnet wire would appear to be a market well worth a pretty good sized gamble.

Philip T. Coffin.

PTC:ags

[fol. 5447] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 224

Internal Correspondence

January 8, 1960.

From: F. L. Magee
Pittsburgh Office
To: Mr. L. E. Hickman
Pittsburgh Office

Re: REA Magnet Wire Company, Inc.

Referring to the attached proposed letter, I wonder if it would not be desirable in expressing our thinking as regards the future operations of Rea, to stress the fact that one of the important advantages of our new relationship is that of fostering leadership in the development and utilization of aluminum magnet wire by virtue of Alcoa's background in aluminum research and development and Rea's background in the magnet wire field.

I ran into Paul Gross of our New York Sales Office the other day and he made the remark that the Rome salesmen

whom he had met are all fine fellows, but in the course of working with them, he has found that they are completely copper-minded, and have little recognition of the fact that we would like to develop the use of aluminum in the electrical conductor field. As a matter of fact, he remarked that the general impression seems to be that we purchased Rome only in order to acquire their copper wire business, whereas we all know that while we want all the copper business we can get, at the same time we are certainly anxious to convert copper wire to aluminum wherever aluminum has a natural advantage. We know that the top people in Rome recognize this situation and it is not at all unexpected to find the rank and file do not yet have a recognition of our aluminum program. Obviously, this is one of the good reasons for coordinating the sales force and particularly to have some of our men tied in with the Rome sales activities.

F. L. Magee.

FLM:RAH

[fol. 5449] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 225

Internal Correspondence

January 18, 1960.

From: Leon E. Hickman
Pittsburgh Office

To: Mr. J. L. Fleming
Pittsburgh Office

Alcoa has this day purchased the assets of Rea Magnet Wire Company, Inc. The Rea Company has plants at Fort Wayne and Lafayette, Indiana. The company specializes in the manufacture of smaller sizes of magnet wire, a product used in coil windings, transformers, motors and other electrical and electronic equipment. It is hoped that Rea, in affiliation with Alcoa, will bring aluminum wire into a number of these markets.

I attach a copy of a statement made to the Rea Company concerning Alcoa's proposed policies in the operation of the company.

Leon E. Hickman

LEH:lhbm

Distribution: Officers, Pittsburgh General Office, Product Sales Managers, District Sales Managers, Branch Sales Managers, Works Managers, Public Relations Managers, Subsidiary Company Heads, Sales General.

Received January 19 1960. John Fleming

[fol. 5450] Aluminum Company of America

1501 Alcoa Building
Pittsburgh 19, Pa.

January 15, 1960.

Mr. Samuel A. Rea,
Chairman of the Board,
Rea Magnet Wire Company, Inc.,
Fort Wayne, Indiana

Dear Sam:

If the stockholders of Rea Magnet Wire Company, Inc., approve the sale of your company to Alcoa, the most challenging opportunity confronting us both is how to utilize your people to the best advantage. Plants and technology are only significant in the hands of the right people. When we were last together, we spent more time on this subject than any other. We in Alcoa have continued to give it a top priority in our thinking because, above all else, we want to maintain the high esprit de corps of the Rea organization and to open to every man and woman in your company improved opportunities under the new program. You are free to tell your people that our thinking is running along the following lines:

(1) *All manufacturing and selling activities of Rea Magnet Wire Company, Inc., now conducted in Fort Wayne*

and Lafayette, Indiana, will be continued in those locations. We already operate aluminum fabricating plants in Lafayette and Richmond and in July, 1960 will open the finest aluminum smelter in the world at Warrick, Indiana. Our experience in Indiana has been outstanding and, with your plants combined with ours, Indiana becomes a major manufacturing center for Alcoa.

(2) *A new corporation, likewise to be known as Rea Magnet Wire Company, Inc., will be formed to take over the properties of the present Rea Company.* Its Board of Directors will consist of a small number of Rea and Alcoa officers selected with an eye to a functional coordination of activities. You and the other officers of Rea will be expected to manage the new company, as you have the old, with only such changes in titles and functions as you have recommended to us or as time and changing circumstances ultimately indicate to be in our common interest. Likewise, the rest of your organization will be carried over intact into the new company.

[fol. 5451] (3) *Wages and benefits.* We agree with you that you should continue your present policies with respect to salaries and wage rates of hourly employees and that you should continue your existing employee benefit plans, including profit sharing. However, should the new company ever be required to negotiate with a union on such matters, the new company can make no commitment as to the continuation of these benefits under those conditions.

(4) *We expect the new company to assume leadership in the development and utilization of aluminum magnet wire.* While we have no intention of minimizing your operations in copper magnet wire, we do anticipate that your experience in the magnet wire field and our know-how in the properties of aluminum can be combined through aggressive research into leadership in the development and utilization of aluminum magnet wire in those applications where aluminum is equal or superior to copper.

(5) *Research.* Both Rea and Alcoa are research-minded. We expect the new company to continue its research activities, indeed to expand them, but also to make full use of the research staff and facilities of Alcoa by coordinating programs.

(6) *We expect the new company to continue the present*

sales organization and policies of Rea, subject only to such modifications as experience may show to be in the common interest. It is hoped that the Alcoa and Rea selling organizations can support each other and coordinate activities to their mutual benefit.

(7) *Purchasing.* We anticipate that the purchasing activities of the new company, particularly in copper, will be handled through its own organization, but in coordination with Alcoa purchases in the same or related fields.

(8) *The new company will operate functionally as a Division of Alcoa.* It will have full responsibility for the manufacture and sale of the products presently manufactured by the Rea Company and such others as may be appropriate to its activities. As a Division of Alcoa, Rea will [fol. 5452] draw upon Alcoa for such help as Rea may desire and Alcoa may have available, whether it be in the field of research, manufacturing or engineering know-how, selling experience, customer contacts, or staff services of any of the numerous kinds made available in Alcoa. It is our intention to give the new Rea organization autonomy and authority commensurate with its responsibilities and to depend upon the good judgment of the Rea organization to make full use of the strength available through affiliation with Alcoa.

(9) *Modifications in the light of experience.* I am sure you realize that, while we speak in complete candor and good faith, these policies must always be subject to modification or change as experience may dictate. A rigid commitment on any of these points would be no more in your interest than in ours. For example, tax considerations may ultimately make it advisable to liquidate the new company into Alcoa and thereafter operate it simply as one of the Divisions of the parent company. Some of your people are quite likely to find additional opportunities for advancement in the Alcoa organization. No decision can be reached now as to where it would be advisable to manufacture new products or supplement the production of existing items.

There is an element of faith in this, as in all worthwhile matters. If we did not share that faith, we would not have offered your company this affiliation with Alcoa, nor would

your Board have recommended its acceptance to your stockholders. We are counting on your people, strengthened by the support that Alcoa can give them, to develop the magnet wire business of Rea, both in copper and aluminum, well beyond its present potential. We can go far together if we maintain a mutual confidence and a willingness to adapt our program to changing circumstances. Subject only to those inevitable contingencies, this letter expresses our full thinking to date.

And I may say that we welcome you and every man and woman in the Rea organization into the Alcoa family with genuine enthusiasm and a confidence that we shall do well in partnership.

With cordial regards, I am

Sincerely, Leon E. Hickman, Executive Vice President.

LEH:lm

[fol. 5453] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 227

General Files

Received February 9, 1960, General Files

Jan. 28, 1960.

Mr. Philip Sporn,
President, American Electric Power Service Corporation
30 Church Street,
New York 8, New York

Dear Phil:

Our interest in the Rome Cable Corporation and now in the Rea Magnet Wire Company was stimulated by our long-time confidence in the future of aluminum in the electrical industry. Thanks to progressive industrialists like you and companies like American Electric Power Service, aluminum continues to make progress in the many fields which involve the use of electric current. In addition, there are, as you

know, many other possibilities for aluminum to be used by the electrical manufacturing and electrical utility industries.

As an old friend of ours, you might be interested to know that these are the first two outside acquisitions ever made by Alcoa. Our decision was made in the belief that we could progress faster by acquiring these two aggressive and highly reputable companies, as well as the fact that we have had friendly relations with these companies for a long time and were attracted by their keen interest in the potentialities of aluminum in their respective fields.

We have been especially attracted by the fine organization which is behind the Rea Magnet Wire Company, from Sam Rea right through to the last workman. We fully intend that they shall continue to operate autonomously, and we have every reason to believe that they can not only expand their operations in the aluminum wire field, but that they will continue to grow in their present field of endeavor.

We in Alcoa always thought it was a pretty sad day when we had to give up any thought of acquiring the Newark, Ohio plant, which is now occupied by one of our good competitors. While the Rea Magnet Wire Company is a comparatively small operation, it is a real pleasure to again [fol. 5454] have one of our operations on the system of A.E.P.

You were most thoughtful to write me such a nice letter about our Rea acquisition. * While we will miss you on April 11th, you will have our best wishes for a pleasant trip to Europe and I can assure you we will be more than pleased to get to know Bud Hill and Red Doyle when we have our Fort Wayne-Rea get acquainted day.

With best regards, I am

Sincerely yours, Frank L. Magee, President.

FLM:RAH

2274

[fol. 5455] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 228

Fine Wire

Commercial Research Division
September 16, 1955

[fol. 5456]

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[fol. 5457] **Summary of Findings**

1. This report describes and evaluates the market for fine wire ranging in diameter from 0.010" to 0.020" and in a few cases as low as 0.005". The insect screening market was omitted. Applications using or showing a potential for the following metals were considered:

Aluminum
Copper and copper base alloys
Stainless steel

2. The total present market, 1954, was equivalent in volume to 81,087,000 lbs. of aluminum. In actual pounds, it was divided by type of metal as follows:

	Pounds	% of Total Metal Volume
Aluminum.....	1,147,000	1.4
Copper and copper base.....	254,466,000	95.1
Stainless steel.....	8,520,000	3.5
Total.....	264,133,000	100.0

The same total divided by major type of end use results in the following:

	Pounds	% of Total Metal Volume
Electrical products use.....	246,101,000	92.8
Non-electrical products use.....	18,032,000	7.2
Total.....	264,133,000	100.0

3. Aluminum fine wire used in 1954 represented 1.4% of the total volume. The principal markets are listed below:

	Pounds
Shipboard cable armor.....	400,000
Aircraft cable.....	350,000
Automotive air filters.....	120,000
Industrial wire cloth.....	102,000
Tea bag staples.....	100,000
Others.....	75,000
Total.....	1,147,000

[fol. 5458] 4. The Alcoa share of the present aluminum market was 39.6% and represented sales of redraw rod and fine wire as follows:

	Pounds
Redraw.....	242,000
Fine Wire.....	212,560
Total.....	454,560

5. Copper and copper base alloy fine wire dominated the 1954 market—95.1% of the metal volume, equivalent to 77,115,000 lbs. of aluminum. The principal copper markets are listed below:

	Pounds
Telephone systems.....	80,757,000
Flexible cords.....	45,000,000
Automotive wiring.....	41,958,000
Magnet wire.....	24,911,000
Power cable.....	16,500,000
Paper mill mesh.....	9,000,000
Others.....	36,340,000
Total.....	254,466,000

6. Stainless steel fine wire accounted for 3.5% of the 1954 market by volume, actually 8,520,000 pounds.

7. The total future market by 1960 is estimated to be equivalent in annual volume to 92,310,000 lbs. of aluminum, 13.8% greater than 1954. In actual pounds, it will be divided by type of metal as follows:

	Pounds	% of Total Metal Volume	% Increase Over 1954
Aluminum.....	20,390,000	22.1	1680.0
Copper and copper base.....	227,690,000	74.8	-10.5
Stainless steel.....	8,770,000	3.1	0 2.9
Total.....	256,850,000	100.0	

This total, divided by major type of product use, results in the following:

[fol. 5459]

	Pounds	% of Total Metal Volume
Electrical products use.....	236,890,000	92.0
Non-electrical products use.....	19,960,000	8.0
Total.....	256,850,000	100.0

8. Aluminum fine wire should represent 22.1% of the 1960 volume. With the exception of aircraft cable, the principal markets of the future will be new ones as listed below:

	Pounds
Automotive wiring.....	7,280,000
Flexible cords.....	6,060,000
Aircraft cable.....	1,250,000
Paper mill mesh.....	1,100,000
Power cable.....	930,000
Others.....	3,770,000
Total.....	20,390,000

9. It is significant that over 90.0% of the sales by primary aluminum producers to the 1960 fine wire markets will be in the form of redraw rod and wire. The bulk of the fine wire will be drawn in captive plants for internal consumption.

10. Alcoa's share of the 1960 aluminum fine wire market should be about 60.0%, divided as follows:

Product	Pounds	% Increase Over 1954
Fine Wire.....	1,243,000	487.0
Redraw.....	11,085,000	4480.0
Total.....	12,328,000	

11. The copper and copper base alloy share of the market by metal volume will drop to 74.8% in 1960, equivalent to 69,000,000 lbs. of aluminum. Their principal markets are listed on the following page:

[fol. 5490]

	Pounds
Telephone systems.....	70,390,000
Flexible cords.....	38,800,000
Magnet wire.....	32,500,000
Automotive wiring.....	30,775,000
Power cable.....	16,000,000
Paper mill mesh.....	8,800,000
Others.....	30,425,000
Total.....	227,690,000

12. The consumption of stainless steel wire will show little change by 1960, up 2.9% to 8,770,000 pounds.

13. Fine wire buying centers located in the northeastern section of the country purchased about 90.0% of the volume used in 1954. The pattern should be the same in 1960.

14. The degree to which the following product requirements are met will have a direct effect on the future sales of aluminum fine wire:

- a. Develop and promote an economical tinning process.
- b. Develop economical joining processes.
- c. Increase drawing speed.
- d. Increase strength-conductivity relationship.
- e. Improve fatigue properties.
- f. Increase elongation without sacrificing yield strength.
- g. Improve consistency of mechanical properties.
- h. Provide an oiled wire.
- i. Provide facilities for special spooling requirements.

15. The present price of EC grade aluminum fine wire is competitive with copper on a conductivity basis in diameters from 0.010" to 0.020". However, even with the lowest prices developed by Alcoa's Accounting Department based on optimum production, EC is not competitive with copper when other costs of manufacturing insulated wire are considered.

[fol. 5461] 16. The present price of 5056 alloy aluminum fine wire is competitive on a volume basis with the other metals considered in this study.

17. Since World War II, the basic ingot price of aluminum has increased 62.7% while copper soared 258.0%. There are no indications that this trend will be reversed during the forecast period. Naturally, any future increase in the spread between basic aluminum and copper prices will improve the chances for the substitution of aluminum.

18. The basic price policies of the fine wire industry are similar; wire is priced by the pound with extras for small quantities. Variations occur in base price quantities; copper has a lower and broader base (200 to 29,999 lbs.) than aluminum (2000 lbs.).

19. Companies drawing fine wire may be classified as follows:

- a. Integrated producers; from smelting to fine wire for sale.
- b. Independent; purchase redraw from others and produce fine wire for sale.

- c. Captive; draw fine wire for internal use, may be either integrated or independent companies.

20. There are only 6 integrated producers of aluminum and copper fine wire but hundreds of independent and captive plants.

21. The fine wire industry has been a follower rather than a promoter. Relatively little money is spent for promotion, advertising or product development.

22. The most effective merchandising method for the sale of aluminum fine wire is direct customer contacts by salesmen and sales development engineers.

23. The normal method of distributing fine wire and redraw rod is by direct mill shipment.

24. Copper producers maintain stocks of wire bars to meet the rapid delivery requirements that prevail in the electrical products market. There is some stocking of fine wire.

[fol. 5462] 25. It may be necessary for Alcoa to increase its stock of EC redraw rod at Massena, but it is not likely that the volume by 1960 will warrant stocking fine wire.

26. Most of Alcoa's fine wire machines are modern. The present idle capacity of 6,000,000 lbs. would be more than necessary to fill the estimated 1960 demand of 1,225,000 pounds.

[fol. 5463] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 230

Long-Term Forecast of the Demand for Aluminum
First Report November 20, 1957

Confidential

George Van Buren Day
Commercial Research Division

[fol. 5464]

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[fol. 5465]

Summary of Findings

The period from now to 1975 promises to be a relatively prosperous one, barring the effects of war not assumed in this forecast. Recessions may be more frequent than in the past but they should be minor and of short duration. The Gross National Product should move ahead at an annual rate of at least 3% compounded annually influenced by a strong growth in population and an annual increase in productivity of 2.65 per cent.

Total net shipments of aluminum in the United States amounted to 4.0 billion pounds in 1955. A 43% increase to 5.7 billion pounds by 1960, and a 108% increase (over 1955) to 8.3 billion pounds by 1965 is forecast. Continuation of this growth pattern envisions a 15.0 billion pound market for aluminum in 1975, 3.75 times the current demand. Because of cyclical variations, aluminum shipments in any one year may not be exactly as forecast; they should follow the past ten-year pattern of varying plus or minus 10% from the forecast trend.

Aluminum shipments should increase in five-year periods as follows:

1955-1960.....	9.0%	compounded annually
1960-1965.....	7.75%	" "
1965-1970.....	7.0%	" "
1970-1975.....	5.75%	" "

Aluminum's maturity in several markets substantiates a lessening of its growth curve, but the potentialities of aluminum use in many other markets cannot yet be fully estimated.

In the next 10 years, Electrical, Packaging, Building Product and Motor Transportation uses will increase their consumption of aluminum at a faster rate than other industries. Some military and aircraft usage will actually decline. About 70% of the growth by 1965 will be accounted for by 30 major applications, led by these six whose combined increase will account for 40% of the industry's increase:

- Doors and Windows
- Passenger Cars
- Primary Electrical Power Cable
- Air Conditioning

Motor Trucks
Highway Freight Trailers

• All major aluminum products will grow in volume. Those exceeding the industry growth rate of plus 108% in the next 10 years are:

Welded Tube
Foil
Electrical Wire & Cable
Permanent Mold Castings
Extrusions
Drawn Tube

Sheet and Die Castings should match industry growth.

Alcoa's share of aluminum volume (exclusive of its shipments of finished products such as rivets, nails, closures, etc.) amounted to 1.54 billion pounds in 1955, or 38.5% of the total. As a result of strong competitive pressures, its shipments may not grow as fast as total industry shipments. A decline in Alcoa participation is therefore forecast over the next 20 years. By 1960, its share should amount to 34.3% (1.96 billion pounds); by 1965, 32.1% (2.66 billion pounds). In the second decade, it is forecast Alcoa's participation will not be allowed to slip below 30%, for a 4.5 billion pound shipment in 1975.

[fol. 5466]

Introduction

At the request of the Sales Vice Presidents, the Commercial Research Division undertook the task of bringing up to date the so-called "Davies Report" of February 4, 1952. Specifically, the objectives were:

1. To make medium and long-term forecasts of the total U.S. demand for aluminum as determined by an analysis of each market's demand;
2. To determine from forecasts the demand for major aluminum products during the period in question;
3. To estimate Alcoa participation.

The year 1955 was chosen as the base year. The years 1960, 1965 and 1975 were chosen for the five, ten and twenty-year forecast periods.

In order to forecast the future demand for aluminum, it is fundamentally necessary to forecast economic trends, and in turn, the future production and sale of products that will use aluminum. Once the economic climate is established for the future, predictions can be made for automobile production, new housing starts, appliance sales, electric power production, etc. The economic basis for this report is the Commercial Research Division's composite of the soundest opinions, predictions and forecasts made by many economists and business organizations. The key indicators chosen are listed in Table 11 (page 35).

This report is based on the "market build-up" method of forecasting. An economic forecast thus provides a basis for measuring aluminum usage in future years if no wider application of aluminum were made. But an allowance must also be made for aluminum's growth possibilities. A thorough analysis of sales and technological developments in each of some 200 applications provided a good measurement of growing usage and the aluminum products involved.

As one source of information, the Sales Development Division's "Crystal-Gazing" report of late 1956 was used. In it, each section listed many possible applications of aluminum with reasonable "promise" of success and gave a measure of the tonnage that might be developed as "new business" for 1961. All Commercial Research Division market studies to date were reviewed. Out of detailed personal interviews with personnel in these divisions, and with some product managers, came a realistic growth pattern for each of the major applications of aluminum.

A forecast to be of benefit must be constantly reviewed and revised. It is important also that each review or revision be conducted within the same framework. A considerable part of this study's task involved the development of a suitable forecasting method and a procedure for identifying shipments of aluminum products to each of the major end uses.

It is planned to review annually total shipments of aluminum by the industry and by Alcoa. Biannually, a review of this entire report is contemplated.

1. "Direct" Participation

A true measure of Alcoa's participation in any market can only be obtained by comparing its "direct" shipments with industry *net* shipments. "Direct" shipments are herein defined as shipments of Alcoa primary products direct to customers who immediately use the product in fabrication or assembly. Excluded are any Alcoa shipments of primary products to customers who first "convert" these products into other primary wrought or cast products before their fabrication or assembly into the end use application. Thus, shipments of Alcoa extrusions to a window manufacturer are counted in "direct" participation; shipments of extrusion billets to a window manufacturer that has a captive press are not counted.

The manner in which industry statistics are gathered does not allow for a direct comparison of Alcoa's *gross* shipments with industry *gross* shipments. Furthermore, shipments of some products for further conversion cannot be market identified.

A clearer understanding of Alcoa's performance in the various markets is obtained if Alcoa is considered to have two major market groups: (1) The End Use Market, and (2) The so-called "Conversion" Market. Its participation in the first can be measured only on a market "direct" participation basis. Its share in the second, and its over-all participation, can only be measured on a product basis.

2. Measurement of Future Alcoa Participation

Alcoa's market participation is based on its share of the use of each aluminum product in each application. Its future participation reflects a growing competitive productive capacity. It appears reasonable to assume that for several major products Alcoa's participation will be severely restrained by the available production capacity and sales efforts of its competitors.

3. Market Classification

Figures in the report are classified by *ten* Major Markets. Some tables are expanded into 40 different categories with-

in those markets. This classification system is essentially the same as adopted by the Aluminum Association and is based on the Bureau of Census' classification of metal consuming industries.

Two Aluminum Association markets have been excluded: the "Conversion" market, for reasons explained in paragraph 1 above, and Distributors and Jobbers, which are not end use markets in themselves. The latter volume was prorated among markets on two bases: (1) obvious end use products, such as irrigation pipe, cable or pigment were placed in their proper markets; (2) all other metal was apportioned among markets according to the pattern of market shipments reported by members to the Aluminum Association, with some minor adjustments.

The volumes shown in each market can be taken to mean "use" or consumption by the market, with the understanding that they are actually "shipments to the user." (Scrap generated in the manufacture of end use products is thus not deducted.)

[fol. 5468] Section I—Total Shipments

Industry Shipments

Complex pressures existed in the last ten years which acted to decrease, as well as increase, the demand for aluminum. Were similar conditions to exist, the strong statistical growth trend should continue well into the future. The Mathematics Service Section of Alcoa's Metallurgical Division analyzed aluminum shipments from the year 1901 and projected the growth curve ten years hence. Its results substantiate this trend of aluminum based on past history.

The "market build-up" method projections are therefore substantiated statistically. As noted on the first graph following, several other independent studies also generally agree with the demand figures shown in this report.

Although a healthy growth is predicted based on past trends, it is also a fact that aluminum's maturity in several markets will act to restrain this trend. At the same time, it is too early to measure the full potentialities of aluminum

use in many other markets. Aluminum shipments should increase in five-year periods as follows:

1955-1960.....	9.0% compounded annually
1960-1965.....	7.75% " "
1965-1970.....	7.0% " "
1970-1975.....	5.75% " "

Past history indicates that shipments may vary plus or minus 10% from the forecast trend in any one year.

Alcoa Shipments

As previously stated, Alcoa's participation in each market can only be measured by comparing its "direct" shipments with industry *net* shipments. Excluded are any Alcoa shipments of primary mill products to customers who first "convert" these products into other primary products before use.

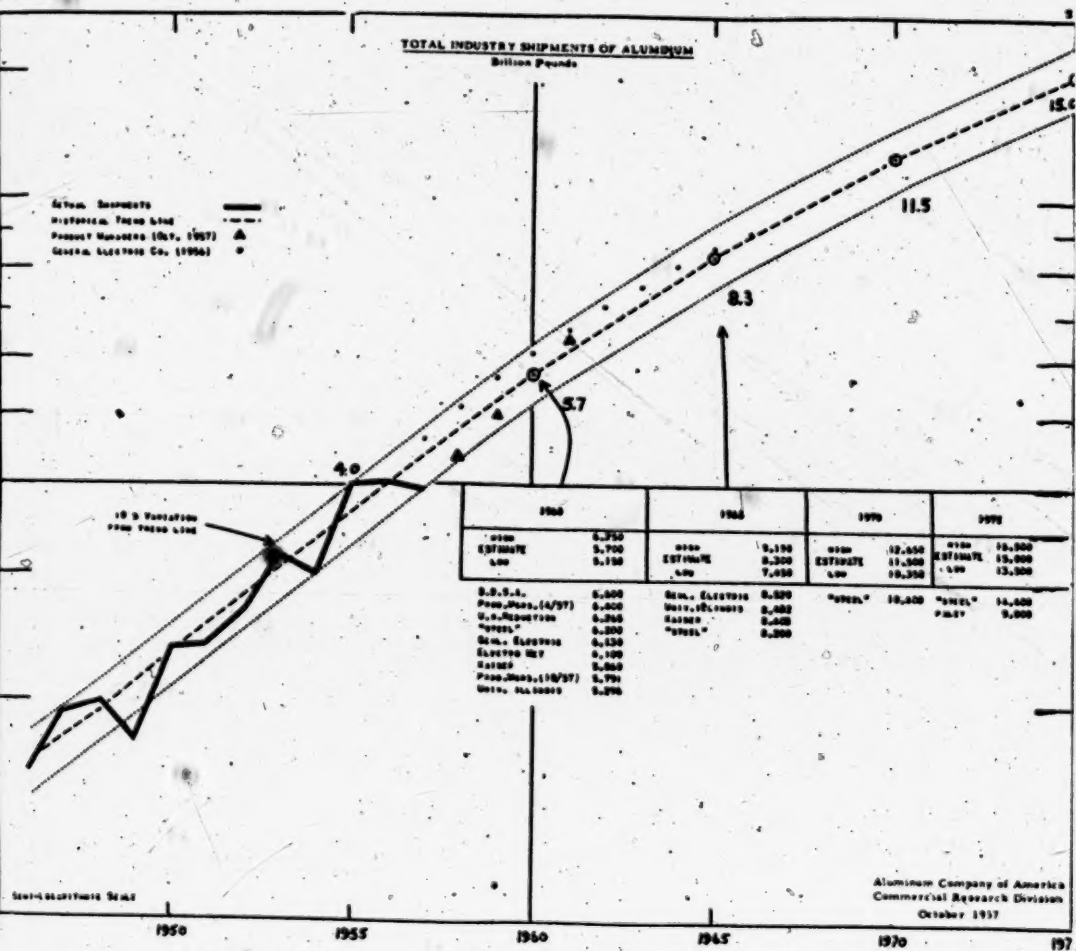
As shown in Table 2, Alcoa's *total* participation is made up of (1) its shipments "direct" to customers for immediate use in fabricated products and (2) its so-called "conversion" shipments.

Alcoa's total share of aluminum volume (exclusive of its shipments of stockpile pig and finished products, such as rivets, nails, closures, etc.) amounted to 1.54 billion pounds in 1955, or 38.5% of the total. Its "direct" participation amounted to 27.6%. Its share of metal supplied by all other producers and fabricators amounted to 15.0%. By 1960, its total share could decline to 34.3% (1.96 billion pounds); by 1965, 32.1% (2.66 billion pounds)—as a result of strong competitive pressures. By 1975, it is forecast that Alcoa's participation will not be allowed to slip below 30.0%, for a 4.5 billion pound shipment in that year.

Alcoa's total shipments to customers thus will show increases over its 1955 shipments as follows:

Year	Alcoa Increase Over 1955	Industry Increase Over 1955
1960.....	+ 27%	+ 43%
1965.....	+ 73%	+108%
1975.....	+192%	+275%

(fol. 5469)



TOTAL ALUMINUM DEMAND

1946 - 1975

Million Pounds

Year	Total Net Shipments (1)	Fitted Trend Line	Variation from Trend	
			10%	-10%
1946	1,604	1,650	1,815	1,485
1947	1,946	1,775	1,952	1,598
1948	1,994	1,940	2,134	1,746
1949	1,766	2,120	2,332	1,908
1950	2,391	2,330	2,563	2,097
1951	2,421	2,550	2,805	2,295
1952	2,662	2,800	3,080	2,520
1953	3,211	3,050	3,355	2,745
1954	3,007	3,350	3,685	3,015
1955	3,997	3,650	4,015	3,285
1956	4,014	4,000	4,400	3,600
1957		4,400	4,840	3,960
1958		4,800	5,280	4,320
1959		5,250	5,775	4,725
1960	5,717	5,700	6,270	5,130
1965	8,307	8,300	9,150	7,450
1970	11,500	11,500	12,650	10,350
1975	14,969	15,000	16,500	13,500

Notes:

- (1) Shipments 1946 - 1949: Department of Commerce.
 Shipments 1950 - 1956: B. D. S. A., Department of Commerce.
 Shipments 1960 - 1975: Estimated
- (2) 10% variation based on shipments 1946 - 1956 being within plus or minus 10% of trend line.

Semi-Logarithmic Scale

**TOTAL INDUSTRY SHIPMENTS OF ALUMINUM
AND
TOTAL ALCOA SHIPMENTS OF ALUMINUM
1946 - 1975**
Billion Pounds

INDUSTRY SHIPMENTS

HISTORICAL TREND LINE

PRODUCT SHIPMENTS (Oct. 1987)

INDUSTRY

ALCOA

Year	INDUSTRY SHIPMENTS	ALCOA SHIPMENTS ⁽¹⁾	ALCOA PERCENTAGE OF TOTAL
	(Million Pounds)	(Million Pounds)	(%)
1946	1,500	300	20.0
1950	2,300	460	20.0
1955	3,000	600	20.0
1960	4,700	940	20.0
1965	6,300	1,260	20.0
1975	15,000	3,000	20.0

(1) INCLUDES STOCKPILES AND FUTURE
PRODUCT SHIPMENTS

Aluminum Company of America
Commercial Research Division October 1987

1950

1955

1960

1965

1970

1975

Table 2
CONFIDENTIALALCOA PARTICIPATION IN THE ALUMINUM INDUSTRY
1946 - 1975
(millions pounds)

Year	Total Net Shipments(1)	Fitted Trend Line	Variation from Trend(2)	Alcoa "Direct" Shipments(3)	Alcoa "Direct" Participation %	Alcoa "Conversion" Shipments(4)	Alcoa Total Shipments(5)	Total Alcoa Participation %
			+10% -10%					
1946	1,604	1,650	1,815	1,485			839	52.3
1947	1,946	1,775	1,952	1,598	(not available)		747	48.5
1948	1,994	1,940	2,134	1,746			1,071	53.8
1949	1,766	2,120	2,332	1,908			718	40.7
1950	2,391	2,330	2,563	2,097			1,083	45.5
1951	2,421	2,550	2,805	2,295	(not available)		898	37.0
1952	2,662	2,800	3,080	2,520			1,047	39.3
1953	3,211	3,050	3,355	2,745			1,240	38.6
1954	3,007	3,350	3,685	3,015			1,065	35.4
1955	3,997	3,650	4,015	3,285			1,540	38.5
1956	4,014	4,000	4,400	n.a.	27.6	435	1,563	39.0
1957		4,400	4,840	3,960	n.a.			
1958		4,800	5,280	4,320				
1959		5,250	5,775	4,725				
1960	5,717	5,700	6,270	5,130	24.8	545	1,981	34.3
1965	8,307	8,300	9,150	7,450	23.6	706	2,466	32.1
1970	11,500	11,500	12,650	10,350				
1975	14,969	15,000	16,500	13,376	22.5	1,127	4,503	30.0

Notes:

(1) Shipments 1946-1949 -- Department of Commerce.

(2) Shipments 1950-1956 -- B. D. S. A. Department of Commerce.

(3) Shipments 1960-1975 -- Estimated.

(4) 10% variation based on shipments 1946-1956 being within plus or minus 10% of trend line.

(5) Direct shipments of Alcoa mill products to all customers, but excluding metal for conversion into mill products before use (i.e., foil stock, redraw rod).

(6) Shipments of ingot, billets, redraw rod, sheet and foil stock, etc., to customers for conversion into mill products before use.

(7) Stockpile shipments and finished product shipments (i.e., collapsible tubes, rivets, nails, etc.) are excluded.

[fol. 5473] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 231

July 11, 1960.

Richard W. Davis
 Commercial Research Division
 Pittsburgh Office
 Mr. William W. Knapp
 Rome Cable Division
 Rome, New York

Confidential

Re: Product Managers' Five-Year Forecast

Ref: Cable & E.C. Wire—Cable Accessories

Confirming our telephone conversation of July 1, the following represents your forecast of shipments for the next five years:

Cable & E.C. Wire Shipments

(Million Lbs.)

	Industry	Bare		Covered		
		Alcoa	% Alcoa	Industry	Alcoa	% Alcoa
1959.....	196	61.9	31.5	61	7.5	12.3
1960.....	195	61.6	31.5	60	7.3	12.3
1961.....	210	66.0	31.5	63	8.2	13.0
1962.....	225	71.2	31.6	65	8.6	13.2
1963.....	245	77.6	31.7	70	9.8	14.0
1964.....	255	81.1	31.8	75	10.5	14.0
1965.....	270	88.0	32.5	80	12.0	15.0

[fol. 5474]

Combination Bare & Covered

	Industry	Alcoa	% Alcoa
1959.....	257	69.4	27.0
1960.....	255	68.9	27.0
1961.....	273	74.2	27.2
1962.....	290	79.8	27.5
1963.....	315	87.4	27.7
1964.....	330	91.6	27.8
1965.....	350	100.0	28.6

The following forecast for Alcoa Cable Accessories was developed by Mr. F. R. Dallye and Mr. R. D. Cook:

Alcoa Cable Accessories
(Million Lbs.)

1959.....	2.1
1960.....	2.2
1961.....	2.3
1962.....	2.4
1963.....	2.5
1964.....	2.6
1965.....	2.7

Richard W. Davis

RWD:mbb

cc: Mr. R. L. Williamson—Rome, N. Y., Mr. F. R. Dallye—Pittsburgh, Mr. R. D. Cook—Pittsburgh.

[fol. 5475] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 232

Insulated Aluminum Power Cables

Aluminum has long been used, and long been completely accepted, as an electrical conductor. All that is needed to verify this is a glance upward at the aluminum transmission lines that criss-cross our skylines. Yet, with all its acceptance and application for overhead conductors and bus, aluminum has not received recognition as a conductor material for insulated power cables except by the aluminum industry itself.

The reasons for this are not hard to find. One of the strongest, however illogical it may be, is resistance to change—in the form of new materials and different procedures—which use of insulated aluminum conductors would present. Equally compelling reasons at one time—and at that time completely logical—were supply and cost: with the exception of brief periods in the late 40's and early 50's, it has only been recently that a sound case could be made for the use of aluminum either on the basis of material availability or installed economy.

Supply

The first chink in the armor of copper's exclusive enjoyment of the insulated cable field came during two brief but severe shortages of copper, immediately following World [fol. 5476] War II and during the Korean War. A considerable amount of insulated aluminum cable was manufactured and installed in 1947, and again in 1952, representing the first real use of aluminum in the field.

Though these were short-range situations, which changed within a few months, they provide a basis of engineering, installation, and operating experience.

Some mistakes were made. One was the use of the same temper of wire—hard-drawn—as is ordinarily used for overhead conductors. This difficulty was overcome by Aluminum Company of America's development of partially annealed tempers, EC-H24 and EC-H26, which have handling characteristics similar to partially annealed copper.

Another difficulty was that fittings which had been found satisfactory for copper were assumed to be equally satisfactory for aluminum. When it was recognized that this was not true, Alcoa opened its laboratories to a number of manufacturers of electrical fittings interested in developing suitable fittings for aluminum. This was accomplished in a relatively short time.

Because of the knowledge gained and the problems solved in these early installations, insulated aluminum has now become the standard for all Alcoa plants. Many of these plants have continuous operations that cannot tolerate shutdown.

[fol. 5477] Of great future significance in looking at long-range availability is the practical fact that the world's supply of aluminum is vastly greater than that of copper. As use of all metals increases, copper will be more and more exclusively confined to the many uses for which it is uniquely suited. Already proven is aluminum's capability to do the job as a power cable. Simply on the basis of future material supply alone, therefore, universal application of the aluminum power cable seems inevitable.

Cost

Insulated aluminum cables are here to stay because present economics and projections of future cost relationships of aluminum and copper favor aluminum. The amount of savings from use of aluminum usually depend upon whether conductor selection is determined by equal resistance or equal temperature rise.

When equal resistance is the factor, an aluminum conductor* must be 1.59 times the cross-sectional area of a given copper conductor, to have the same d.c. resistance. For A.W.G. sizes this means that a No. 6 aluminum wire has the same d.c. resistance as a No. 8 copper wire. How- [fol. 5478] ever, even with this increase in cross-section, use of aluminum results in the conductor having less than half the weight of a comparable copper conductor. This is illustrated by saying that one pound of copper will produce a No. 8 wire twenty feet long, and one pound of aluminum will produce a No. 6 wire 41 feet long, while both will have the same d.c. resistance per foot.

If conductor selection is based upon allowable temperature rise, (current carrying capacity tables), an aluminum conductor need have only about 36 per cent more cross-sectional area than a comparable copper conductor. The weight of aluminum in this circumstance is only 41 per cent the weight of the copper conductor to do the same job. Tests show that, depending upon size, aluminum conductors have 78 to 84 per cent the capacity of the same size copper conductor having the same insulation. The following is a tabulation from the AIEE publication, *Electric Power Distribution for Industrial Plants*, October, 1956:

Aluminum Current-Carrying Capacities—60 Cycles

Conversion factors for determining current ratings of aluminum conductors from values given for same size copper in IPCEA current-carrying capacity tables.

* "Conductor" as used in this article refers to the metal wire portion of the cable.

[fol. 5479]

Standard Concentric Stranding

For Cables in Air, or in Non-Metallic Conduit		For Cables with Metallic Sheath or in Metallic Conduit	
(1) Size	(2) Factor	(3) Size	(4) Factor
.....	.....	Up to No. 1	0.78
Up to 500	0.78	1/0-4/0	0.79
600	0.79	250-400	0.80
700-900	0.79	500-800	0.81
1000	0.80	900-1000	0.82
1250	0.80	1250	0.82
1500	0.81	1500	0.83
1750	0.82	1750	0.84
2000	0.83	2000	0.84

From a practical point of view, current-carrying capacities can be obtained from Tables 1a and 2a, National Electric Code, 1956 Edition. Comparative tests have shown that these values provide a safety margin in excess of the copper equivalents.

In choosing aluminum cables, it is hard to justify anything smaller than No. 6 aluminum. This is logical when you consider that the smaller the wire, the greater the proportion of total weight represented by insulation. The cost of metal decreases in importance as wire size decreases. Conceivably, a point could be reached where it would make little difference whether aluminum, copper, or silver conductor were used. On the other end of the scale, very significant savings can be had if aluminum is chosen for [fol. 5480] the larger wire sizes. The overall savings by use of aluminum for a large industrial plant built in 1947 was about 40 per cent on nine million feet of building wire.

The manufacture of insulated wire and cable with aluminum conductors follows essentially the same pattern and uses the same equipment as does insulated wire and cable with copper conductors. Manufacturing experience to date shows there are no special insulating problems.

The long-range outlook for the cost of insulated aluminum conductors is for a continually increasing advantage over comparable copper cables.

The basic economics of the product—supply and cost—seem, therefore, to dictate that now is the time for conductor manufacturers and users to look to aluminum.

Design

The techniques used in designing with aluminum are almost the same as those with copper. It is recommended practice to design an installation with aluminum from the start, rather than substitute aluminum for copper at a later stage. Too often the mere substitution of aluminum for copper in a layout results not only in "overdesign," but very frequently a false economic picture that denies the user the best possible application for the least expenditure. [fol. 5481] The rule-of-thumb use of aluminum two A.W.G. sizes larger than copper should be avoided, if the good characteristics of aluminum are to be fully realized. The current carrying capacities of aluminum conductors are established by the National Electric Code, Tables 1a and 2a, for the various classes of insulation. The "spread" of use for any given cable size often permits size-for-size replacement of copper by aluminum, where service is to be in the "overlap area" of the two conductors.

Insulations. Aluminum conductors are manufactured with the same variety of insulations as copper conductors. Unlike copper, aluminum does not have a deteriorating effect on rubber insulations which is particularly a problem at high temperatures. The de-rating factors for temperatures above 30°C listed in the National Electric Code are the same as those applied to copper.

Conduits. Larger ducts are not always needed with aluminum. For example, where the diameter of the conductor itself is small compared to the overall cable diameter, as in the case of high voltage cables, increased duct size is frequently unnecessary. Another typical situation is where the comparable copper cable diameter is at the beginning of a given range of conductor diameters suitable for a particular duct size; the larger aluminum cable generally falls within the range of diameters of cable that may be installed in the duct.

[fol. 5482] Comparisons for three single-conductor, 600-volt, rubber-insulated, neoprene-sheathed network cables of approximately the same current-carrying capacities and reactances, installed in underground conduit, will show this:

Copper Cable		Equivalent Aluminum Cable	
Size	Conduit	Size	Conduit
#6	1 1/4"	#4	1 1/4"
2	1 1/4"	1/0	2"
1/0	2"	3/0	2"
4/0	2 1/4"	350 MCM	3"
350 MCM	3"	500 MCM	3"
500 MCM	3"	750 MCM	4"

* No increase in conduit size required.

Since voltage drop is often the determining factor in the selection of wire sizes, the difference in voltage drop between cables in magnetic conduit and those in non-magnetic aluminum conduit should be considered at the design stage to realize maximum savings from the use of both aluminum cable and aluminum conduit.

Installation

Aluminum cable is installed using essentially the same methods and tools as for copper cable. More care is required in making up connections, but this is generally offset, especially in the larger sizes, by easier handling of the aluminum cable—which weighs only about half as much as the equivalent copper cable. The use of lighter weight [fol. 5483] aluminum eliminates from the job some heavy rigging for handling, and much of the backbreaking labor.

Use of Joint Compound. Aluminum is a high conductivity metal and the thin oxide coating which quickly forms on it after manufacture is highly resistant to corrosion. However, this oxide is also an electrical insulator, and must be removed from the surfaces to be joined, in order to make a good electrical connection. This oxide is easily removed by abrading the surface with emery cloth or a wire brush, after first coating the surface with a grease-type joint compound which excludes air and prevents re-oxidation. It is important that connections be made in this way. If they are so done, the resulting connection will be of low resistance and trouble-free, provided, of course, that suitably designed accessories are properly installed, as outlined later.

An electrical connection to aluminum should never be made without joint compound. There are a number of good

compounds on the market, such as Alcoa No. 2 Electrical Joint Compound. The principal purpose of the compound is to protect the surfaces to be joined from oxidation. It excludes air from the surface during abrasion, and continues to protect the termination after it is completed. Some of the joint compounds on the market have metallic or abrasive powders included in the grease to aid in breaking down the oxide on mechanical compression and aid in producing a high conductivity joint. The primary purpose of the compound—to exclude oxygen—should be kept constantly in mind. [fol. 5484]

Connectors and Terminals. Aluminum connectors and terminals should be used with aluminum conductor wherever possible. If high operating temperatures are anticipated, and if steel or copper bolts are used in connectors, they should be made up with effective spring washers, such as the Bellville type, to provide for the greater thermal expansion of aluminum. If steel or copper bolts are used without spring washers, any heating from high loads or high ambient temperatures may cause deformation of the aluminum, resulting in a loose connection of higher resistance upon cooling.

Complete lines of good, dependable connectors and terminals for aluminum are available from the major manufacturers.

All approved types and sizes of compression terminals and sleeves made of aluminum give excellent results. Many of these have joint compound installed at the factory, to speed and simplify installation.

All types of mechanical bolted connectors are available in aluminum. Plated steel or copper bolted connectors can be used if satisfactory spring washers are included in the bolts where high operating temperatures are anticipated.

Probably the best electrical joints, especially in the larger sizes, are made up by welding. A complete line of welded [fol. 5485] lugs and terminals is available for virtually all cable sizes 1/0 and larger.

Service Record

Aluminum conductors have been used with success in all types of power service—aerial, conduit, duct, and direct-burial installations. In a five-month period in 1947, one

company shipped about one-half million feet of insulated aluminum cable, representing over 200 individual items, to 70 industrial plants and utilities throughout the United States. The bulk was in sizes 1/0 to 1,000,000 cm. The voltages ranged between 600 and 15,000 volts. A survey made after about four years of operation disclosed that no difficulties had been encountered with the cable itself.

The largest single user of insulated aluminum cable is the aluminum industry itself. After making several pilot installations over a period of years, in 1946 Alcoa adopted insulated aluminum conductors as standard for all new construction and all maintenance installations. Since that time, Alcoa has installed over 40 million feet of insulated aluminum conductors. Other major aluminum producers have also standardized on insulated aluminum conductors. It is estimated that the total insulated aluminum cable in service in the aluminum industry alone exceeds 100 million feet. This attests to the reliability of service that may be [fol. 5486] expected with aluminum cable, since so many operations in the aluminum industry depend upon uninterrupted power, maintenance of which could not be compromised by decisions unrelated to the dependability of the product.

A change-over from insulated copper to insulated aluminum conductor imposes no major problems. It merely requires that the user follow the same sound engineering practices, making the minor changes in technique that follow naturally when one metal replaces another. The changes are small; the savings are large.

[fol. 5487] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 233

Rome Cable

Division of ALCOA

Application for Consigned Stock Approval

(Note: This form to be completed by Sales Office and signed by Manager of Rome Cable Division Sales.)

Application is hereby made for approval of consignment as indicated by the following statements:

1. Distributor Kingston City Electric Supply Company, Inc.
2. Street Address 21 Grand Street
City Kingston Zone: State: New York
3. Investment and Sales Data.

Investment: Sales:				
	Approx. Consignment Investment Requested	Last Calendar Year	Actual This Cal- endar Year To Date	Estimated Next 12 Months
Copper Wire & Cable.....	7000	45,000	.....	45,000
Aluminum Wire & Cable...	1000	4,500	.....	5 to 6,000
Aluminum Accessories.....	None	.....	.....	.....
Aluminum Conduit.....	None	.....	.....	.....
Total.....	8000	49,500	.....	50,000

(Note: Above actual and estimated figures should include Rome and/or Alcoa sales.)

4. Anticipated turnover 3-4 times per year.
5. Distributor now has consignment from manufacturers as follows:

Copper Wire & Cable	Aluminum Wire & Cable	Aluminum Accessories	Aluminum Conduit
None	None	None	Alcoa
.....
.....

(Indicate name of consignors under proper heading.)

[fol. 5488] 6. List all Rome Cable Division distributors in this distributor's same trading area. Indicate with (*) if distributor has Alcoa—Rome Cable consignment.

Mid Hudson Electric Supply Corp.
Poughkeepsie, New York

7. Type of product for which consignment is anticipated
(Indicate by check mark):

Copper—	Bare & Weatherproof	X
	Bare & Weatherproof (Carton)	X
	Building Wire	X
	SE & Self-Supporting	X
	Machine Tool Wire	
	Portable Cords and Cables	
	Mining Machine Cables	X
	RoMarine-RoPrene—Type USE	X
Aluminum—	Accessories	
	Covered Line Wire	X
	Multiplex Service Cables	X
	Bare Aluminum & Bare ACSR	
	Aluminum Rigid Conduit	X

8. Remarks (Explain any circumstances you feel are pertinent to the desirability of this consignment):

At the present time we do not have a distributor in Kingston. It is felt that the addition of this outlet will result in adding about \$60,000 to our volume without disturbing our present distribution set-up at Poughkeepsie

Signed _____, Manager, Rome Cable Division
Sales.

Date:—

[fol. 5489] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 234

Aluminum Company of America

Ralph O. Keefer
General Purchasing Agent

Pittsburgh 19, Pa.

December 12, 1951.

Mr. A. D. Ross Fraser, President,
Rome Cable Corporation,
421 Ridge Street,
Rome, New York.

Dear Mr. Fraser:

I am sorry for not having written to you sooner as a result of our telephone conversation of several weeks ago when you called me regarding the inquiry for aluminum cable for the Wenatchee and Rockdale projects. We were much slower in finally disposing of this inquiry than we usually are; however, there were many ramifications involved due to the aluminum situation in general and further because some vendors are drawing aluminum while others are not. I was, however, glad to see Rome in the final go-around for at least part of the cable that was up for purchase at the time.

One thing about the negotiation, however, that was somewhat baffling to me was the fact that you were rather competitive on the smaller sizes; i.e., 8 to 12, whereas on the larger sizes you were not too competitive. Perhaps as you gain additional experience in the insulating and handling of aluminum this situation will right itself, and you will be more competitive in the larger sizes.

With respect to the electrical conductor situation in general, we recently heard something that was somewhat disturbing. I understand that your Mr. R. A. Schatzel, who was Chairman of the symposium on polyethylene-covered wires and cable at an AIEE meeting in Cleveland, recently

made the statement that the new aluminum reduction plants could not produce conductor metal, and therefore the addition of these new plants would not relieve the electrical conductor situation. Apparently this opinion was handed down by someone in Washington who is not familiar with the facts. The facts are that any aluminum reduction plant can produce metal suitable for electrical conductor if the proper metallurgical control is maintained. It is therefore a matter of choice to some extent anyhow whether an aluminum reduction plant or a portion thereof does or does not produce metal suitable for electrical conductor.

[fol. 5490] At any rate, all of our plants, present and contemplated, can produce electrical conductor metal if we elect to so operate them.

We think, therefore, that the increased capacity that will come into production in the next few months is going to relieve the present aluminum shortage and that there is a very bright future for aluminum in the electrical conductor field. Principally the economics should motivate it, but perhaps the present and probable continued shortage of copper will be the most dominating influence.

If we can add any information or data for the benefit of Mr. Schatzel or anyone who may have misinformed him, we would be glad to be given the opportunity.

With kindest personal regards, I remain

Very truly yours, T. O. English.

TOW:bw

[fol. 5491] In UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 235

FULLER &
SMITH &
ROSS INC.
CLEVELAND
NEW YORK
CHICAGO

FILMS • TELEVISION • RADIO

Aluminum Company of America

Sound Slide Film for
Electrical DistributorsFirst Draft -- 7/1/54
Revised -- 7/14/54

FULLER &
SMITH &
ROSS INC.

CLEVELAND
NEW YORK
CHICAGO 7-15-54 em

FILM • TELEVISION

SCRIPT

Aluminum Company of America

Sound Slide Film for Electrical Distributors

Part I -- "Working For Your Future"
REVERED

NUMBER	ACTION	SOUND
1.	TITLE: ALCOA Presents	INTRODUCTORY MUSIC
2.	TITLE: "Working For Your Future"	CONTINUE MUSIC
3.	ANT: Early laboratory scene (of aluminum production).	NARRATOR: Less than three quarters of a century ago, aluminum was so scarce as to be considered a semi-precious metal ... (MELL)
4.	ANT: Early laboratory electrical set-up.	and the utilization of electricity as we know it today was just beginning ... (MELL)
5.	ANT: Symbolic aluminum pot and power line ...	Electricity ... at the approximate rate of ten kilowatt-hours for every pound of metal ... is the "ingredient" that made large- scale production of aluminum possible ... (MELL)
6.	ANT: Symbolic high voltage lines ... crisscrossing the country ...	Aluminum has returned the favor. Aluminum conductor carries electricity into every corner of the nation. More than 90% of the high-voltage power in North America is transmitted on aluminum ... (MELL)
7.	ANT: Symbolic distribution system to city and farm homes ...	And aluminum conductors are used extensively to distribute power to urban areas and farm homes all over the nation. (MELL)

[fol. 5493]

FULLER &
SMITH &
ROSS INC.
CLEVELAND
NEW YORK
CHICAGO

FILM • TELEVISION

SCRIPT FOR

-2-

NUMBER	ACTION	SOUND
8.	ART: Split frame. Symbolic research man ... Symbolic production plant ... Titles: <u>Alcoa Research & Production.</u>	<p>The advantages of aluminum as an electrical conductor were apparent from the start..</p> <p>Between that early recognition and today's widespread use of aluminum conductors lie countless hours of research and hundreds of millions of pounds of electrical conductor production by Alcoa.</p> <p>(MELL)</p>
9.	PHOTO: First Aluminum transmission line. <i>Handwritten: Hartford Station, Pa. Tariffville, Hartford Conn.</i>	<p>In 1899, Alcoa developed and sold the first aluminum transmission line in the United States, which proved the advantages of aluminum for power line construction.</p> <p>(MELL)</p>
10.	PHOTO: CU piece of ACSR showing make-up ...	<p>In 1909, William Hoopes, Electrical Engineer for Alcoa, perfected a new cable consisting of aluminum wires stranded around a core of galvanized steel ... the product known today throughout the industry as ACSR ... Aluminum Cable, Steel Reinforced.</p> <p>(MELL)</p>
11.	PHOTO: Glamorized shot of ACSR MELL ...	<p>ACSR retained the advantages of all-aluminum cable ... high conductivity, corrosion resistance, and light weight ... In addition, ACSR has the highest ratio of strength to weight of any conductor ... The result ...</p>

[fol. 5494]

FULLER &
SMITH &
ROSS INC.CLEVELAND
NEW YORK
CHICAGO

FILM • TELEVISION

SCRIPT

NUMBER	ACTION	SOUND
		longer spans, fewer supports, more economical construction.
		(MELL)
12.	PHOTO: First ACSE line in 100 KV range. (Southern Sierra Power Co. line) <i>How Cal. Edison Elec. Power Co. - San Bernardino - Pasadena, Cal.</i>	In 1913, the first ACSE line in the 100,000 volt range was energized using Alcoa ACSE ...
		(MELL)
13.	PHOTO: First Aluminum distribution line. <i>City of Pomona, Kansas</i>	Another Alcoa first was accomplished in the early 1900's with the first aluminum distribution line using Alcoa weatherproof conductor ...
		(MELL)
14.	PHOTO: First ACSE line in 200 KV range (Big Creek). <i>Southern Cal. Edison Co. - Big Creek - Los Angeles</i>	And, in 1923, Alcoa ACSE was the conductor on the first 200,000 volt line when voltage was increased on this line which had been in operation since 1913 at 150,000 volts.
		(MELL)
15.	PHOTO: First Expanded ACSE line. SPLIT FRAME: Cutaway of expanded ACSE. <i>Amer. Gas & Elec. Co. Spain Sta. Karawha W. Va.</i>	In 1953, after 20 years of research and development, Alcoa pioneered again with Expanded ACSE ... the super high voltage conductor that is Alcoa's latest and still exclusive development.
		(MELL)
16.	PHOTO: Sag-Tension Table for ACSE...	In addition to developing and perfecting ACSE and other conductors, Alcoa engineers created the universally recognized "Graphic

[fol. 5495]

FULLER &
SMITH &
ROSS INC.
CLEVELAND
NEW YORK
CHICAGO

FILM - TELEVISION

SCRIPT FOR

2311

NUMBER	ACTION	SOUND
		Method of Sag-Tension Calculations" which for the first time enabled engineers to determine accurately the stresses in the aluminum and steel components of the conductor under any conditions ... (MELL)
17.	PHOTO: Samples of different strandings ... ACSR.	Alcoa engineers developed the several types of stranding needed for various services and in cooperation with the steel wire manufacturers, they developed standard specifications for the reinforcing steel wire for ACSR ... (MELL)
18.	PHOTO: Man installing dead end on line	The accessories and fittings necessary for the successful and economical use of ACSR were the products of Alcoa engineering and research ... (MELL)
19.	PHOTO: Armor rods installed on cable ...	For example, Alcoa invented and developed the familiar armor rods which protect transmission conductors from vibration damage, wind whipping, chafing and flash-over burns at the points of support ... (MELL)

SCRIPT FOR

2312

-5-

NUMBER	ACTION	SOUND
20.	PHOTO: Compression Fittings ... Dead ends and clamps.	Compression fittings for joints and dead ends and snubbing type dead ends and clamps were invented and developed by Alcoa ... (BELL)
21.	PHOTO: Stockbridge Damper installed on line	After acquiring the original patents for the Stockbridge Damper ... Alcoa engineers improved and made them commercially available for every size and kind of conductor. (BELL)
22.	PHOTO: Niagara Falls plant installation ... bus bar	Not all of Alcoa's research in the electrical field has centered on wire and cable. The company pioneered in the use of aluminum bus conductors in 1896, when flat bar aluminum was used for the 33,000 ampere bus at the Niagara Works ... (BELL)
23.	PHOTO: Point Comfort Works ... Bus Bar installation ...	Since then, aluminum bus has found increasing favor in a wide variety of manufacturing, chemical, and electrical installations. Many of the problems involved in its use have been solved in Alcoa's own plants where more than 40 million pounds of aluminum bus are in operation. (BELL)

[fol. 5497]

FULLER &
SMITH &
ROSS INC.CLEVELAND
NEW YORK
CHICAGO

FILM - TELEVISION

SCRIPT

NUMBER	ACTION	SOUND
24.	Out.	
25.	Out.	
26.	ART: ALCOA ... First in Aluminum Conductor & Accessories	Alcoa was first on the market with aluminum conductor and accessories ... (MILL)
27.	ART: Symbolic researcher ... TITLE: ALCOA ... First in Aluminum Conductor Research	And Alcoa's leadership in electrical conductor research has contributed the major developments in aluminum electrical products for the electric light and power industry ... (MILL)
28.	Out.	
29.	PHOTO: CU: Building nameplate... at Massena ... or shot of new building, if completed.	The largest single company facility devoted exclusively to aluminum conductor research is the Electrical Conductor Laboratory at Massena, New York, operated by the Electrical Engineering Division of Aluminum Research Laboratories. (MILL)
30.	ART: Montage of photos of lab activities ... CU of men reading instruments, etc. ...	Here thousands of man-hours and square feet of floor space are given over to many research problems and tests that tell how to improve the performance of aluminum products in electrical service ... (MILL)

[fol. 5498]

FULLER &
SMITH &
ROSS INC.

CLEVELAND
NEW YORK
CHICAGO

FILM - TELEVISION

SCRIPT FOR

-7-

2314

NUMBER	ACTION	SOUND
31.	PHOTO: MS of outdoor span testing facilities ...	Alcoa's outdoor test facilities at Massena make it possible to reproduce field conditions on spans from 400 to 1500 feet to study the many problems of vibration and fatigue ... (MELL)
32.	PHOTO: Wind measuring equipment	Wind velocity and direction are constantly measured and recorded by sensitive devices in the instrument house ... (MELL)
33.	PHOTO: Man checking paper	Miles of such records have been examined to find the answer to the causes of conductor fatigue and what can be done to prevent it. (MELL)
34.	PHOTO: Instruments measuring cable vibration ...	Other instruments provide data on the nature of vibration, its amplitude, frequency, wave length, and the effectiveness of various devices in protecting the cable and damping the vibration. (MELL)
35.	PHOTO: MS of lab test spans ...	In the laboratory, accelerated vibration-fatigue tests on conductor and accessories are conducted under controlled conditions ... (MELL)

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NUMBER	ACTION	SOUND
36.	PHOTO: CU man watching cable. (This might be strobe shot to show cable vibration).	Samples must withstand five hundred million vibration cycles in laboratory tests ... as assurance that the cable will stand up during the many years of life expected of it in actual field service. (MELL)
37.	Out.	
38.	PHOTO: Man testing connectors ...	Also, the performance of numerous types of connectors for aluminum to aluminum and aluminum to copper is studied to guide the design and improvement of Alcoa accessories. (MELL)
39.	PHOTO: Test set-up of bus bar ...	Precision instruments accurately measure the electrical performance of test samples of bus bar and accessories ... (MELL)
40.	PHOTO: Test set-up for ACSR temperature measurements ...	Thermocouple wires connected to test spans of ACSR make possible accurate measurements of temperature ... (MELL)
41.	Out.	
42.	PHOTO: Lab nameplate at New Kensington or MS of lab.	Another phase of Alcoa research for the electrical industry is carried on at the Alcoa Process Development Laboratories in New Kensington, Pennsylvania. (MELL)

[fol. 5500]

FULLER &
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CLEVELAND
NEW YORK
CHICAGO

FILM - TELEVISION

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NUMBER	ACTION	SOUND
43.	PHOTO: Montage of several welding operations, CU:	Here Alcoa engineers and technicians are constantly at work developing and improving methods and processes for joining aluminum conductors ... (MELL)
44.	PHOTO: Soldering demonstration	In this lab, Alcoa constantly studies new methods and materials for soldering aluminum to aluminum and aluminum to other metals. (MELL)
45.	PHOTO: Welding pigtail ...	They have also developed processes and equipment for making welded joints ...
46.	PHOTO: Brazing tube ...	for brazing ...
47.	PHOTO: Cold welding ... with samples of sheet, foil and wire.	and their latest research is in the practical use of pressure welding or "cold" welding methods for aluminum wire, sheet, and foil ... (MELL)
48.	ART: Symbolic production plant ... TITLE: Alcoa ... First in Electrical Conductor Production	To make available the products of Alcoa's electrical research -- is the job of Alcoa's vast production facilities. (MELL)
49.	ART: Map with Alcoa Mining Overlay ...	Alcoa's mining operations, which produce the bauxite ore from which aluminum is refined, are located in Dutch Guiana, the United States, and in the Dominican Republic. Two other Alcoa mining locations in the

SCRIPT

NUMBER	ACTION	SOUND
		United States produce fluorspar and limestone, required in the aluminum process.
		(BELL)
50.	ART: Map with ALCOA Refining overlay...	In Alabama, Arkansas and Illinois are Alcoa's processing and refining plants which extract aluminum from the raw earths ...
		(BELL)
51.	ART: Map with Alcoa Smelting overlay...	Here are Alcoa's smelting plants which reduce alumina to Aluminum ...
		(BELL)
52.	ART: Map with Alcoa Fabricating overlay ...	And here are Alcoa's fabricating plants, which transform aluminum into useful shapes and forms ...
		(BELL)
53.	PHOTO: Massena and Vancouver plants.	Two Alcoa plants, at opposite ends of the continent ... Massena, New York, and Vancouver, Washington, supply electrical conductor and accessories ...
		(BELL)
54.	PHOTO: Sign at Massena ...	Let's make a brief tour of the Alcoa Massena plant and see how Alcoa conductor and accessories are produced ...
		(BELL)
55.	PHOTO: Men tapping pot in smelter ...	First stop is the smelter ... where electricity turns alumina into Aluminum ...
		(BELL)

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FULLER &
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NUMBER	ACTION	SOUND
56.	PHOTO: Men pouring pig ...	The molten metal is poured into the form of pig ... (BELL)
57.	Out.	
58.	PHOTO: Ingot entering rolling mill ...	For electrical wire and cable ... ingots of EC alloy aluminum approximately 6 by 6 inches square ... (BELL)
59.	PHOTO: 3/8 rod coming off mill.	are rolled into three-eighths-inch rod in a continuous rolling mill. (BELL)
60.	PHOTO: Rod stock going into wire machine ...	The rod is then drawn precisely ^{precisely} to the wire diameter required for different sizes and types of electrical conductors ... (BELL)
61.	PHOTO: Cable stranding machine ...	Modern cable stranding machines form the wire into aluminum cable or ACSR. (BELL)
62.	PHOTO: CU Physical Lab sign ...	Throughout the production process, the Physical Testing Laboratory maintains a continuous check for quality and uniformity. (BELL)
63.	PHOTO: Quantometer test ...	A sample of each "pour" from the smelter is tested by the quantometer to be sure that it ^{it} meets metallurgical specifications ... (BELL)

SCRIPT FOR

NUMBER	ACTION	SOUND
64.	PHOTO: Man making conductivity test ... samples of rod and wire.	The 3/8-inch rod and the wire are tested on a statistical quality control program for weight, conductivity ... (MELL)
65.	PHOTO: Man making tensile strength test ...	... tensile strength and elongation ... (MELL)
66.	PHOTO: Man making test on steel wire ...	Samples of the steel wire used as a core for ACSR are continuously tested for specified properties ... (MELL)
67.	PHOTO: Making test on tension machine of finished cable ...	Here also are made the stress-strain tests on finished cable which are the basis for all sag and tension calculations. (MELL)
68.	PHOTO: Reel of cable in field... lineman working with it ...	These continuous tests throughout production assure that every foot of Alcoa electrical conductor delivered meets rigid standards for metallurgical, mechanical and electrical uniformity ... (MELL)
69.	PHOTO: Group of accessories ...	At Massena, Alcoa also produces a complete line of conductor accessories ... "dead ends", compression joints, parallel groove clamps, armor rods, Stockbridge Dampers and many others ... (MELL)

[fol. 5504]

FULLER &
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SCRIPT

NUMBER	ACTION	SOUND
70.	PHOTO: Pattern shop...	In the pattern shop, skilled craftsmen translate accessory designs into precision forms for production patterns. (BELL)
71.	PHOTO: Foundry ... molding	In the foundry, sand molds are carefully made and ... (BELL)
72.	PHOTO: Foundry ... casting ...	the accessory parts are cast ... (BELL)
73.	PHOTO: Machine shop ... assembling 280 series clamp...	The completed castings are finished and assembled ... (BELL)
74.	PHOTO: CU Drilling hole in clevis for dead end...	Precise holes are drilled in the steel clevis ends of compression dead ends to assure that these fittings develop at least 95% of the rated strength of the conductor. (BELL)
75.	PHOTO: CU soldering copper bushing in pg clamp.	Copper bushings are soldered into the parallel groove clamps for aluminum to copper connections a procedure with a long and generally excellent history. (BELL)
76.	PHOTO: Group of accessories packed for shipping ...	and the finished products are carefully packed for shipment ... (BELL)

SCRIPT FOR

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NUMBER	ACTION	SOUND
77.	PHOTO: Montage of testing and inspection operations on accessories ...	Here again, continuous inspection and tests maintain a rigid quality control to assure that each accessory will give the service it was designed for ... (BELL)
78.	TITLE: ALCOA Research and Production ... 1. Supply Quality Products 2. Improve Performance 3. Seek New Applications	Alcoa's Research and Production for the electrical industry proceeds toward three major objectives ... First, to supply high quality products and materials for the use of the industry; second, to discover ways to improve the performance of aluminum electrical products; third, to seek new applications for aluminum in the electrical field ... (BELL)
79.	ART: Symbolic researcher ... Symbolic plant ... TITLE: ALCOA Research & Production ... working for your future ...	Many of the problems that have faced Alcoa and the electrical industry have been solved ... many still remain and new ones have appeared ... Toward the solution of these problems and others yet to come ... ALCOA Research and Production will continue to contribute from its great fund of knowledge, experience and resources ... working for your future. (BELL)
80.	END TITLE ...	MUSIC UP AND HOLD TO END ...

[Vol. 5506]

FULLER &
SMITH &
ROSS INC.
CLEVELAND
NEW YORK
CHICAGO

FILM - TELEVISION

SCRIPT

Aluminum Company of America

Sound Slide Film for Electrical Distributors

Part II - "Profit by Experience"
Revised

NUMBER	ACTION	SOUND
1.	TITLE: Alcoa Presents ...	INTRODUCTORY MUSIC
2.	MAIN TITLE: "Profit by Experience"	CONTINUOUS MUSIC ...
3.	Chart showing expanding Market for Aluminum Conductor and Accessories ...	On the basis of all the facts and figures available, the market for Aluminum Conductor and accessories is growing by leaps and bounds ...
		(BELL)
4.	PHOTO: Transmission Line ...	Aluminum is already used to transmit more than 90% of the high voltage power in North America.
		(BELL)
5.	PHOTO: Distribution Line in Urban area.	And, aluminum conductors continue to grow in preference for primary and secondary distribution and service drop ...
		(BELL)
6.	Out	
7.	Out.	
8.	PHOTO OR ART: Salesman with catalog or brief case ... looking at group of signs ... Utility, REA, Mfg., Co., etc...	For you, as a salesman of aluminum conductor and accessories, this means growing opportunity for extra sales and profits ...
		(BELL)
9.	PHOTO OR ART: Same Salesman ... looking at group of signs ... Many little salesmen going in.	But, competition is growing, too. As the sellers market becomes a buyers market ... more manufacturers enter the field, and as

[fol. 5507]

FULLER &
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FILM - TELEVISION

SCRIPT

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NUMBER	ACTION	SOUND
9.	continued	sales efforts are stepped up ... (BELL)
10.	PHOTO or ART: Salesman looking seriously at camera ...	You have to sell more aggressively and, most important of all, you have to have the products and manufacturing support that helps you get your share of this business at a profit ... (BELL)
11.	ART: ALCOA offers you .. 1. Complete Line 2. Dependable Quality 3. Continuous Advertising	Alcoa gives you these 3 advantages ... a complete line of aluminum electrical conductor and accessories of dependable quality, backed by continuous advertising support. Let's see how these Alcoa advantages help you sell ... (BELL)
12.	PHOTO: Alcoa Electrical Catalog... TITLE: 1. Complete Line	First, Alcoa manufactures and stands behind a complete line of both aluminum electrical conductors and accessories ... including (BELL)
13.	PHOTO: CU: Samples of aluminum and ACER cable ...	ACER and all-aluminum wire and cable in a complete range of sizes and types ... (BELL)
14.	PHOTO: CU: Samples of Covered wire and triplex ...	Covered wire and service drop ... (BELL)

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[fol. 5508]

FULLER &
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FILM - TELEVISION

SCRIPT

NUMBER	ACTION	SOUND
15.	PHOTO: Group of accessories...	Accessories for a.l. conductors ... (BELL)
16.	PHOTO: Group of bus conductors...	Aluminum bus bar ... (BELL)
17.	PHOTO: Group of conduit.	And corrosion-resistant Alcoa Aluminum Rigid conduit ... (BELL)
18.	PHOTO: Order pad on desk ... TITLE: Seal Complete Job ...	This means that when you sell Alcoa you have a better opportunity to sell the complete job ... (BELL)
19.	PHOTO: Repeat IC ... ADD TITLE: Extra Sales & Profits	To make extra sales and increase your profits ... (BELL)
20.	PHOTO: Shot of completed line ... ADD TITLE: One responsibility	And there is one responsibility for quality, shipping and delivery, and for the performance of the finished line ... (BELL)
21.	ADD TITLE: Backed by Alcoa Headquarters & Field Engineering Staff.	Alcoa stands behind you with a complete headquarters and field engineering staff to assist with your customers problems. (BELL)
22.	ART: Alcoa 2. Dependable Quality	Every product in the Alcoa line gives your customers Dependable quality ...

NUMBER	ACTION	SOUND
22.	continued	quality based on Alcoa's outstanding research, development, testing and production facilities (BELL)
23.	PHOTO: Group of ACSR samples ...	For example, let's look at aluminum conductor J.. By one standard, the ASTM specs, aluminum conductors may look the same ... But, by other standards ... (BELL)
24.	PHOTO: Same as 21 ... cross out all but one labeled ALCOA ...	The electric light and power industry's own, Alcoa Aluminum Conductor is a preferred product. Here are the plus factors you give your customers when you sell Alcoa Aluminum Conductor ... (BELL)
25.	ART: Montage of photos of testing of ACSR ...	Every run tested throughout every production phase for metallurgical, mechanical, and electrical uniformity ... (BELL)
26.	PHOTO: Reel of cable coming off strander ...	Consistently uniform manufacture and tight stranding ... (BELL)
27.	PHOTO: Group of different sizes of cable ... including covered wire and triplex ...	Cable for every service requirement, including designs for special applications. (BELL)

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[Vol. 5510]

FULLER &
SMITH &
ROSS INC.CLEVELAND
NEW YORK
CHICAGO

FILM • TELEVISION

SCRIPT

NUMBER	ACTION	SOUND
29.	PHOTO: Group of accessories TITLE: ALCOA Accessories	Alcoa engineers developed the basic designs for most of the accessories needed for aluminum conductors ... (BELL)
29.	PHOTO: CU Band installing dead-end on conductor ...	For example, Alcoa developed and patented the design of this "snubbing type" dead end. Made of high strength, heat-treated aluminum alloy, it saves the time and trouble of wrapping the conductor with armor wire ... (BELL)
30.	PHOTO: Dead end on pole ...	This design develops 95% of the cable strength and prevents slippage of the steel core on ACSEH. It also reduces vibration fatigue failure at the mouth of the clasp. (BELL)
31.	PHOTO: Loop-type dead end on pole ...	Alcoa engineers also developed these high efficiency clasps for loop type dead-ends... (BELL)
32.	PHOTO: Group of compression fittings.	Compression fittings for dead-ends, joints, and other applications were originally developed by Alcoa ... (BELL)

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[fol. 5511]

FULLER &
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ROSS INC.
CLEVELAND
NEW YORK
CHICAGO

FILM • TELEVISION

SCRIPT

2327

NUMBER	ACTION	SOUND
33.	PHOTO: Armor rods being installed on cable ...	ARM, armor rods, both straight and tapered, were the result of Alcoa's continuing research on the problems of vibration fatigue. (BELL) Alcoa Research is constantly testing and trying new ideas to improve Alcoa accessory performance and manufacture. For example ... (BELL) This is an Alcoa parallel groove clamp. One major problem with this type of conductor is contact resistance ... (BELL) As a result of extensive tests made by Alcoa's Electrical Conductor Research Laboratory, the aluminum grooves of these clamps receive a special treatment in manufacturing ... (BELL) Tests indicate that because of this treatment plus a factory dip in NO-OX-ID, the customer receives this Alcoa clamp with an 82% reduction in contact resistance. (BELL)
34.	PHOTO: Montage of research lab photos:	
35.	PHOTO: CU: Hand holding parallel groove clamp ...	
36.	PHOTO: Test set-up for clamps in lab.	
37.	PHOTO: CU: Clamp connection. Overlay Title: Contact Resistance Reduced 82% ...	

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[fol. 5512]

FULLER &
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NEW YORK
CHICAGO

FILM & TELEVISION

SCRIPT FOR

NUMBER	ACTION	SOUND
38.	PHOTO: Group of Parallel Groove Clamps of all types ...	This is only one plus factor you give your customer with Alcoa Parallel Groove Clamps ... Their proved design and quality manufacture assure customer satisfaction and longer service. (MIL)
39.	PHOTO: Montage ... Accessory Mfg. ...	And, Alcoa research to improve performance is continuously in operation guiding the design and production of Alcoa conductor accessories to assure you of dependable quality and extra selling advantages ... (MIL)
40.	PHOTO: Group of covered wire and triplex ... TITLE: Alcoa Covered Wire and Cable ...	Alcoa developed and produced the first covered aluminum conductor over 50 years ago. Some of this conductor is still in service. The same high standards of quality are maintained today in the manufacture of Alcoa covered wire and cable. (MIL)
41.	PHOTO: Copy of test report ... Sample of triplex ...	For example, every length of Alcoa self-supporting secondary distribution and service drops ... must successfully withstand an AC test voltage of 1500 volts.

[fol. 5513]

FULLER &
SMITH &
ROSS INC.
CLEVELAND
NEW YORK
CHICAGO

FILM - TELEVISION

SCRIPT FOR

2329

NUMBER	ACTION	SOUND
41.	continued	Certified test reports are available. (BELL)
42.	REPEAT FRAME 22.	You can easily see how the dependable quality of all Alcoa electrical conductor and accessories can help you make more sales ... (BELL)
43.	ART: ALCOA 3. Advertising	Another important point is ... Alcoa's continuous advertising arriving before you and paving the way for more sales ... Alcoa is a well known name to your customers ... and, that's only one way Alcoa advertising works ... (BELL)
44.	PHOTO: Group of ads ... Electrical ads in foreground...	Alcoa uses many kinds of advertising ... for many purposes ... Each kind is care- fully planned toward specific objectives ... for example ... (BELL)
45.	PHOTO: National magazine covers and TV set.	Take general advertising ... the kind that appears in national magazines and on television ... (BELL)

[fol. 5514]

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FULLER &
SMITH &
ROSS INC.
CLEVELAND
NEW YORK
CHICAGO

FILM - TELEVISION

SCRIPT

NUMBER	ACTION	SOUND
45.	TITLE: PURPOSE: ADVANCE THE CAUSE OF ALUMINUM MAINTAIN ALCOA'S LEADERSHIP	Its purpose is to advance the cause of aluminum against other materials, and to maintain Alcoa's position of leadership in the industry ... (BELL)
47.	PHOTO: Group of Industrial Magazine covers (electrical field)	Then consider Alcoa's extensive trade ad- vertising ... (BELL)
48.	TITLE: PURPOSE: ACQUAINT PROSPECTS WITH ALCOA PRODUCTS, ADVANTAGES, AND TECHNIQUES.	Its purpose is to acquaint your prospects and customers with Alcoa electrical products ... their advantages and in- techniques for using them ... (BELL)
49.	PHOTO: Sales follow-up sheet ... and ad schedule sheet.	and advertising, like selling must be continuous ... It must take care again and again ... or lose its effectiveness ... (BELL)
50.	PHOTO: Group of Magazines. TV set ... Electrical ads in foreground.	Therefore, Alcoa Electrical Conductors and Accessories appear regularly in the general advertising program of Alcoa. (BELL)
51.	PHOTO: Sample ad over Trade Maga- zine covers (Utility Campaign)	And, Alcoa advertises to your Utility and Rural Electrification customers through ads like these. (BELL)

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FULLER &
SMITH &
ROSS INC.
CLEVELAND
NEW YORK
CHICAGO

FILM - TELEVISION

SCRIPT

2331

NUMBER	ACTION	SOUND
52.	PHOTO: Sample Bu. Bar Ad, over Magazine Covers ...	Alcoa Aluminum Bar Bar is advertised with a regular campaign in these publications read by industrial firms, contractors and engineers...
		(BELL)
53.	PHOTO: Direct Mail Pieces on electrical products.	To localize and tie all Alcoa advertising to you ... direct mail pieces, like these with your imprint, are supplied for mailing to your customers and prospects.
		(BELL)
A.	PHOTO: Product Literature on electrical products.	Alcoa also supplies many kinds of beautiful product and technical information literature for your customers ...
		(BELL)
B.	PHOTO: Motion Picture Cart and Films ...	... And Alcoa motion pictures such as "On the Money" and "Electric Wiring with Aluminum" help your customers make better use of Alcoa Aluminum Conductor and accessories ...
		(BELL)
C.	ART: Repeat Frame 43.	The biggest advertising program in aluminum history is working for you every day for extra sales and profits.
		(BELL)

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[fol. 5516]

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NEW YORK
CHICAGO

FILM • TELEVISION

SCRIPT FOR

NUMBER	ACTION	SOUND
7.	ART: Repeat Frame 9.	These are the selling advantages you have with Alcoa ... A complete line of aluminum electrical conductor and accessories, of dependable quality ... backed by a powerful continuous advertising program. (BELL)
8.	ART: ALCOA First In Aluminum	You have these advantages because ALCOA is first in aluminum. (BELL)
50.	ART: ALCOA ... First in Aluminum Conductor and Accessories	And, Alcoa is first in Aluminum Conductor and Accessories. (BELL)
60.	PHOTO: Screen looking at graph of expanding markets ...	You can use Alcoa experience to help you make more sales and extra profits in this growing market for Aluminum conductor and accessories ... (BELL)
61.	PHOTO: group of electrical products ...	So, take this opportunity to increase your sales and profits ... push your complete line of Alcoa products ... recommend and sell them to your customers ... then you will profit by experience ... (BELL)
62.	ART: END TITLE:	MUSIC UP AND HOLD TO END.

[fol. 5517] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 236

Rome Cable Corporation

1955 Sales Conference

"Copper or Aluminum"—G. E. Rolston

We will mail to you shortly a copy of Aluminum Magnet Wire Price Sheets. I wish to call to your attention the new case price of 60.01¢ per pound. The quantity discount from base is based on 5,000 pounds, compared to 15,000 pounds for copper and is 2½ cents per pound as compared ¾ cents per pound for copper. The adders have been multiplied by a factor of 3.3 times the adder for copper magnet wire. This pricing structure is based on the theory that we should receive the same dollars per thousand feet, (no pounds) for covering any given metal. In other words, it costs us the same amount of money disregarding scrap, which is negligible, to cover 1000 feet of a given size of aluminum as it does to cover the same size copper conductor. Machine speeds are the same, the amount of covering is the same and for all practical purposes all cost factors, such as labor, expense and overhead are identical for performing our work on a per-thousand foot basis.

This brings up the subject of pricing insulated cables having aluminum conductor with any type of insulation and covering. Here, also, we maintain that we should receive the same dollars for performing our services for covering aluminum as we do for covering copper. Taking into consideration the slightly lower cost in freight because of the reduced weight, we have factors that we use and, without going into exact details, to price a piece of aluminum cable, we use the following method. For example, to price a quantity of #4/0—600 volt RR cable—first we subtract from the selling price the price of the #4/0 copper conductor. The remainder is the dollars we receive for covering the conductor with 5/64" RoMarine insulation and 4/64" NeoPrene sheath. We believe we should be paid the same dollars and cents per thousand feet to cover #4/0 Alu-

minum, so we merely add the selling price per thousand feet for the insulated and jacketed aluminum cable.

Unfortunately, there is some indication that other manufacturers in the industry either do not agree with this formula or are not cognizant of the effect it will have on a profit and loss statement. There is a price sheet in the industry today that lists #4/0 Type RR cable—aluminum conductor at a selling price cheaper than the selling price for #4/0 RR cable copper conductor less the #4/0 copper conductor. In other words, some manufacturer is apparently willing to cover #4/0 copper for a given figure and #4/0 aluminum for a much lesser figure. This simply does not make sense economically, and if there is a great swing to aluminum conductor and this pricing policy was followed, there simply wouldn't be enough dollars at the end of the year to meet all our expenses.

With this 43 cent plus copper market that we now have, you will find when you return from this meeting a greatly increased interest in aluminum wire and cable of all types. U. S. Rubber is still promoting RH-RW and TW Aluminum Building Wire, including the branch circuit sizes. We, as a company, have not promoted Aluminum Building Wire and have not announced that we are in the Aluminum Building Wire business. If, and when we do, however, we would prefer to manufacture size #2 and larger—however, we may be forced to go to #6, but in no event will we manufacture aluminum building wire in the branch circuit sizes—#8, #10, #12 and #14.

[fol. 5518] We feel that the end user should be experienced in the use of and handling of aluminum building wire and that this is not the case with some of the people that are working with branch circuit wiring. Generally, an electrician using #2 and larger will be a qualified, competent electrician, trained in the use of aluminum conductor and the chances of getting into trouble are, of course, less. For example, Alcoa, who have had as much experience in the aluminum building wire field as anyone in the country, have experienced difficulties in the branch circuit sizes with respect to connectors, and so on.

We realize that you are being asked what our thoughts are as far as aluminum conductor is concerned. The only information that we will give to a customer will be of a

very basic and fundamental nature, and it will have to be up to your customer to make the decision as to whether or not he wants to use aluminum in the place of copper. There are certain problems of installation and connectors and things of that nature that will have to be solved.

In summary, Mr. Rolston stressed that, if the swing to aluminum conductor increases to any great extent within the next three to five months, we will have a difficult time in securing enough metal to keep up with orders. In view of this, he asked that any inquiries for large amounts of aluminum for delivery within the next three to five months to be referred to Rome before acceptance.

[fol. 5519] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 242

Rome Cable Corporation

1958 Sales Conference

C. H. Ellis—Production Highlights . . . and Lowlights

What I would like to do is brief you as well as I can on the happening since you were here last because I feel there has been a lot of progress. I feel that this down-turn that we had, some of the changes in our labor relations, and the attack on costs may have been one of the finer things that could happen to us. You know it is difficult to make changes when you are loading all of your equipment and your manpower. When you have enough time to breathe and select and do some of the things that Jack brought out from the "Wall Street Journal", you find that you can get ambitions to do a lot more than you possibly thought before. Basically we would like to discuss the area that you occupy here.

We told you last year that when the Engineering building was completed, the Lab went into their Gold Coast, that we were going to try to assemble our operations from 3 blocks into 1 where we could make decisions with the flexibility that was required. We found that being so far

apart we couldn't actually get first things first on a day to day basis and that's what you will have to do in these times. We realize it. Ross has preached that we must be flexible and I know this sales group is finding that out just as much as we are. I want to assure you that we have tried to help.

Now basically in this building now, we have our top operations group right in the center, we have our industrial engineering and our mechanical engineering on this top floor on either side of us and downstairs we have the production programming, the personnel department, and we have the technical supervision section along with the production supervision. It only takes a moment to assemble the heads of all of those departments and make decisions and it is certainly working out excellently. Now in doing this lay-out, we made some analysis which runs into the cafeteria section and in the cost saving requirements, we found that that was quite a heavy cost. Actually, our estimates at the present time in physical cash lay-out runs between 35 and 50 thousand dollars a year saving and in man power saving assuming only 10 minutes per man and that is a very small amount of time to estimate that we had lost per man under our old system, it runs to another 50 to 70 thousand dollars a year. It just happens to be one of the things as Jack mentioned, about transportation costs. One of the things that he spoke of in our new scrap handling set-up. It is surprising how you can have high cost operations that are amenable to analysis and elimination. In our personnel, the changes have been minor in content and major in application. Lee White came from the Lab and took over the technical supervision. He has eight men under him which includes a plant chemical control lab and raw material control and a compound mixing lab. Those were originally a part of laboratory control. In addition he has his trouble shooters and is getting them trained, and himself trained, to cover the whole plant effectively.

In our relationship with the laboratory and the engineering department, we are coming to an excellent understanding of the responsibilities of each and I believe it is showing results. As Mike Popchik and Sid Mills said, I think that we are getting good, and we will get much better application of the needs for new products, the lab development in getting into the swing of plant operation which will

certainly give you people a better service and a better product. We have had a lot of new products in the last eight months. I will discuss some of them a little later when we get into departments. Austin Woolley, who had the technical supervision, is now assistant to Bill Jones. Bill is retiring the first of the year, and Frank will have a man, [fol. 5520] over in that very important rubber covered and plastic section, that has a good, broad, technical background and also a good production and personnel background. It is part of the plans that were laid out several years ago. We have moved some other people from the technical supervision sections into operations and in this way, we feel that we are going to improve our personnel. As some of us are getting a little older, we are very, very cognizant of the fact that we want to leave the plant in good strong new hands. I look down this particular sales group; I see a great many that are my contemporaries; I see the younger group and I even see the second younger group coming in and those are the boys both in sales and production that we are all going to rely on.

Now for equipment development plans, we take our first basic fundamentals of the rod mill. The rod mill is not a large department. It has varied since we started from 23 to 30 men depending upon the increased production that was developed and we have added new equipment. We have added a coil tier that is new. There are only about two or three of them in existence and we still have bugs to work out; but, it saves us a great many man hours. A year ago it took 27 men to operate the mill. As of this moment, we are operating with 20, and a saving of 7 men in the rod mill is a lot of money. That is a high paying place. Probably 6 or 7 thousand dollars a year, depending upon the overtime. We do have problems as far as meeting all of the technical requirements. Some of it is inherent with the type of operation. It is one of the problems that Rudy has; to see if there is a better way to get a copper rod from a wire bar. We have had some experience in aluminum and continuous casting, and we can see a lot of advantages. The problem of ends on rods as they are fed into these rolls is difficult. There were many improvements and savings there.

In the bare wire, the most notable change was the divorce-

ing of the die shop from the bare wire operation and putting a supervisor, a trained and well adapted man, to head up the die shop and we are now making our own diamond dies and establishing much better standards for all of our dies. We were fortunate in getting Billy Roux, who ran his own die business, his whole family has a background of dies from the old Rome Wire Company, and it is a notable improvement in our ability to get economies and better quality. Also in that department of bare wire, we are replacing our small stranders. That may not mean so much to you, but it does to us because of the increase in instrumentation cable business and the added requirements for the small strands that has developed. We have additional units and more that will be ordered. We have also, at long last, approached a large package of fine wire overcoming the technical problems of payoff. It is our feeling that that is definitely accomplished and we will be into the large package of fine wire in a very short time. We are in our own operations, and it is now just a matter of getting spools to supply our customers. We are now talking about 40 and 50 lb. packages of #30 and finer.

The aluminum department—we have our ups and downs due to the aluminum business in general, but as far as operation is concerned, it has been quite satisfactory. From our Properzi process, with a notable improvement, we are able to produce for our own use and supply, when we have need for it, a 4,000 lb. package of aluminum rod. That's equivalent to roughly, 12,000 lbs. of copper and that is a heck of a lot of volume. This is a very economical way for your customers to handle aluminum rod as we have certainly found out. We are in a position to supply this package, and would recommend consideration of it by any of [fol. 5521] your potential customers—at least on an experimental basis. We can see no reason why it should not ship well. We have also developed the payoff rack to handle these 4000 lb. coils, which could be supplied to your customers at a reasonable cost.

We would now like to take up the Rubber Covered and Plastic Department. When you visit this department you will see the large 44" cabler which will be ready to operate within a few days, handling high number multiple conductor instrumentation, telephone, and certain con-

trol cables. This unit is supported by 30" cablers which are the base assembly for 4, 5 or more conductors which we finally assemble in the large cabler. There are two of these that are replacing four old vertical cablers, which happen to be one of the types of equipment that I think caused us more trouble in our development of instrumentation cable than any other piece of equipment we have. They were darn fine units to make SJ cord, but they were lousy units to handle the size 18-22 conductor with about a 10 mil wall. They could wreck more than we could really handle. These are out of the picture. We have acquired additional 24" Edmonds twistors to make the pairing. We have put in strand pre-heaters in the plastic machines which is a technical requirement long recommended by the laboratory.

Then we come to our mixing department. I had some very nice compliments from some of the boys that I didn't really feel might have the appreciation for what we are doing in that department. This matter of cold feed has been just about one year longer in coming to a head than we had anticipated. I have always said we were optimists, I have always said we try to get 90% correct, but I think in this one we were only about 50%; but we got it and under the guidance of the lab and Lee White and his technical group, we are making improvements in the mixing time. I think quality standards as of this date, are the best we have ever had and in addition, we have cut the cost \$70,000 a year in mixing; and our bogey for the completion of the job is an additional \$50,000 which I believe will be forthcoming when the completed job is done. Roller feeds on the CV's—they had man power elimination as the original desire, but quality has proven of equal importance. We have three in operation and they will be expanded to all units. When you get into such things as Butyl and some of the other different compounds we find that the old methods of feed do not work. The surface adhesion of the compounds are different and we do have lots of problems. Mechanical adaptations, such as roller feeds, can improve that. Equipment that we still have to install to complete this particular set-up are four new 1½" plastic extruders. You viewed the prototype in the laboratory. Again, that was a long development. I think probably, Rudy, Mac and I all believe it took a lot longer than it should have, but

we made a lot of improvements that we didn't think of when we first started. The basic idea is in reverse—slow down the production—sounds like a crazy thing, and get multiple units so that we can eliminate re-spooling, so that we can spool finished packages, so that we can provide an insulation that has a higher dielectric, because it isn't under stress at extrusion, so that we can handle very small conductors as you heard yesterday. We know we can handle size 26; and I am quite confident that we will get clear down to size 30 to meet our very tough competition that makes such special cables. We want to get into that business. We will have four of those in production in about a month or a month and a half. One of our other bottlenecks was spiral marking. Those are not the nicest operations in the world. They take a lot of technical control to produce a consistent stripe and you certainly do get into trouble with your customer if you don't have a consistent stripe, and, one that will remain on the wire under any conditions. It has been a bottleneck, so we are doubling our productive capacity. [fol. 5522] These should be ready, I believe, about the end of this month. We have made improvements on the regular tubers because there is more heavy insulation high voltage type that is required and have made improvements in our practices of extrusion by use of vacuum. We are quite sure we can lay on jackets that are extremely accurate concentrically; something that we hadn't really thought that we could do quite as well, up until a few months ago. Lee is actively developing that, for not only that type of cable, but possibly into insulations as well. We are expanding our diameter control equipment.

We are trying to automate within the flexibilities that we have to have for the very large number of items that we have to produce. I was one who applauded quietly when Glenn asked you to take 26 items off your list if you are going to have one more to it. It is surprising the loss of production that occurs with multiple set-ups, due to the number of items. We hope some time to see the statistics and the economics and get a relationship between the pieces of equipment you have and the number of items that have to be produced. I think you have heard, more accurately than I can give you, information about the flat and square enamel equipment. You saw it; it's been a technical devel-

opment and I believe that we are just about ready to take over. We have had our problems. Fortunately, some of the problems on our base wire had plenty of lead time to resolve the new flat rolling equipment that we developed last year and which has stood us in such good stead for the Simplex type of very accurate flats. That information, development of edging molds, is quite helpful and also the cleaning of those flats is quite helpful in our development of enameled flats and squares. I think we can satisfy you when we get into operation for you.

Jack mentioned the copper scrap. That was a very funny thing. We had heard that at least one company had eliminated the baling and burning of scrap. Sometimes you can make as much money on your salvage as you can on your product and with the low prices that we have, salvage operations become quite a good savings item. We have another problem, of course; that is the area problem, as we had our scrap department right in our oldest building and in a long range view, we are always looking towards elimination of that old high cost maintenance building. You probably saw out in the mill those large containers that we have. Jack did a fine job in working out with our copper people the way in which we can handle it and we now just take these containers and send them right over to the car, dump them in, pile them, push them, separate them, and we do not have all that manual job of separating, burning, baling, assembling the loads; it's all out in one crack. We can keep our plant cleaner, we can give Jack a better turnover of scrap and we make very, very fine savings in the whole operation.

A little data on labor savings. We realize that we must have more efficient methods of operation and have made some notable improvements. We tried to assemble some way to graphically put it to you. In the first place, during the downturn in business from October 1957 to April 1958, we laid off 220 employees. October wasn't the high point in our employees of last year, but it was the beginning of the heavy downturn. We have put back approximately 170 of these. That has helped our labor relation problem exceedingly. But, as far as the number of employees, we tried to pick out during last year, a month that might be comparable with this year and analyze it, good or bad, as

to either our savings in labor or excess use of labor. We found that April 1957 had about the same productive output [fol. 5523] put in the two main departments of the rubber covered and plastic as June of 1958. We used these two combinations to analyze. In the first place, the rubber covered and plastics as far as the manpower utilization for output, using 100% for April of 1957 went up to 112.3% for June of 1958. The general output was the same, but we do know that the complexity of the cables manufactured in June of this year was greater. In other words, we actually required more man hours per pound of copper and aluminum in this year than we did last year, but we still had a 12% improvement. In the number of people who are in these two departments, we had 319 for the same general output in April 1957, and only 257, or saving of 61 people in June of this year, of operation.

Now some of these changes that I have told you about equipment have been accountable for some developments of industrial engineering, namely a workload method of analysis, getting more work out of people. Elimination of cafeteria is some of it. But it does make a sizeable improvement. I am very happy that we had some of these improvements when we had the price situation or it would have been even worse. I don't mean that, by any means, we are finished. Jay has a cost reduction section integrated with two other sections and hypothetically we have a lot of places to still attack. Service departments dropped from 308 to 261 men for these same two months, or a saving of 47, about 100 less people in the two main operations. I will have to say that our efficiency in our magnet and weather-proof dropped about 15%, mainly due to reductions in orders, making it impossible to get efficient crews to give the service. Rod mill went up 3.7% in these months, but that 3.7 is actually much higher because there happened to be a month of June that we were working out the details of the coil tier. I would like to just refer back a moment to the plastic department and rubber covered. Instrumentation cable has been a beautiful opportunity to fill the mill, to get some activity, to get some experience, and I feel very strongly that with these new cable twisters, with the new plastic extruders, with the new spiral marking and one additional development that we still have to accomplish, is

high speed damage free shielding. We have a lot of improvements to make in that and when we complete that set-up we will have a good opportunity to be one of the first in that growing line of operation. Just one last thing; the relationship between the lab and engineering and the operations. Rudy outlined the theory last year and I concurred. We have had many meetings on it. I believe that when we complete the orientation between these two sections that we will have one of the fastest action product development and factory control organizations in the wire industry.

[fol. 5524] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 243

cc: D. H. Thayer—Rome
S. Johnston—Chicago
P. J. Lopushinsky—Rome
R. R. Davis—Kansas City

January 31, 1958.
Gesco—Des Moines

Dear Pete:

Attached is an application for a consignment of aluminum products at the General Electric Supply Company in Des Moines, Iowa. This consignment is requested because a certain amount of business has been promised to us through this wholesaler by the Iowa Power & Light Company.

This is the same utility that purchases our products through Interstate Electric Supply Company and per permission from Jack Woods the same prices will apply on the contract which I will receive until the first of July of this year. These prices are based upon the February 15th, 1957 sheet and the cost to the wholesaler is as follows—

Triplex—The maximum price less 15 and $7\frac{1}{2}$ per cent.

Weatherproof—The maximum price less 15 and 5 per cent.

ACSR and Bare Aluminum—The maximum price less 5¢ a pound and 3 per cent commission.

Covered products are shipped only into the wholesaler's stock. Bare products are shipped only direct.

I have hopes and have been led to believe by the utility purchasing agent that although we are starting out in a small way this business should increase appreciably during the coming year. At the start we are going to stock only Triplex and the utility has suggested the following—

30,000 ft. "Carp"
2,000 ft. "Shad"
1,000 ft. "Barricuda"

He should purchase this much each month and in any case has guaranteed to purchase it every two months.

Since we have done previous work on this and I feel assured this consignment will be approved I have told the customer he may place his original order.

The wholesaler has also requested a consignment of our copper products but I have asked him for more data before I pass a request onto you. When this is received I will contact you.

Yours very truly, —, —.

RRD:bc
Enc.

[fol. 5525] cc: D. H. Thayer—Rome
P. J. Lopushinsky—Rome
S. Johnston—Chicago

January 31, 1958.

Mr. H. B. Heitzman,
General Electric Supply Company,
108 East Fourth Street,
Des Moines, Iowa

Subject: Iowa Power & Light Company

Dear Heitz:

This is to advise that my headquarters in Rome have advised that it will be satisfactory for you to place your first consignment order prior to the signing of a consignment agreement. In other words, we feel that the agreement

is routine and so that we might get some of the business in February from the Power Company it might be well for you to place an order immediately.

In accordance with our conversation with Rex Jorgensen yesterday will you kindly make the original order out as follows—

- 30,000 ft. #4—3/Condr. Aluminum Triplex—code name “Carp” in 500 ft. paper wrapped coils
- 2,000 ft. #2—3/Condr. ditto—code name “Shad” on
- 1,000 ft. non-returnable reels
- 1,000 ft. #1/0—3/Condr. ditto—code name “Bar-ricuda” on 1,000 ft. non-returnable reels

On the face of your order in large type please put “On Consignment”. Please send your order to this address.

You will hear from us very soon concerning the signing of a formal consignment agreement.

Yours very truly, R. R. Davis.

RRD:bc

[fol. 5526] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 245

cc: E. C. West—Nashville

April 8, 1958.

C. J. McMurry—Atlanta
J. R. Woods—Rome
Townsend Hardware Co.
Jackson, Tennessee

Dear Mac:

With reference to your memo of April 4, I am sure you can understand when I say I am not particularly anxious to have the aluminum business you outlined at prices shown because of the profit squeeze on this product. However, if you feel that it would help your relationship with the jobber

to be competitive on orders of this nature, I would suggest that you go ahead and attempt to get the order on the basis of Southwire's prices.

Very truly yours, —, —.

JRW:reh

[fol. 5527] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 246

cc: A. D. R. Fraser
G. E. Rolston
D. H. Thayer
G. A. Brodock

April 24, 1958.

File

J. R. Woods

Aluminum Price Situation

The following is background on aluminum developments leading to our price authorization of April 22nd. Competitive reports and correspondence substantiating this information are attached to Mr. Rolston's copy.

On March 27th, Stan Williams advised that we had a telephone call from Mr. Granger of Aluminum Limited Sales, reducing pig by 2¢ a lb. Stan checked with Alcoa and Kaiser but could not get confirmation that they would follow.

Alcoa and Kaiser went to 24½¢ EC pig on April 1. Both announced that appropriate reduction in fabricated products would follow shortly.

We revised metal symbol on aluminum orders but made no move to revise prices except on "firm except metals" orders (Detroit Edison and Commonwealth Edison only).

We heard nothing of aluminum conductor price changes and feelers to Alcoa and Kaiser indicated an intent on their part not to adjust prices.

On 4/3, Kaiser advised that they were reducing ¾" EC rod in standard coils to 28¢ a lb. This reduction made the adder over pig 3.5¢ a lb. as opposed to the previous 8.10¢ a lb.

We received conflicting reports on competition as follows:

4/8—New England advised that Kaiser had reduced list prices on covered conductor by 15%. Bare and ACSR by 3 to 5¢ a lb. This report was revised on 4/9 with the statement that no official list reduction had been made but Kaiser had authorized distributors to use 10% beyond sheet where necessary.

4/9—Atlanta reported that Kaiser had advised Gesco—Johnston City price on any quantity of covered aluminum was best column less 15% either for drop shipment or shipments to stock.

4/9—Kansas City advised Kaiser reduced Central Illinois triplex contract price by 2¢ a lb. aluminum weight.

4/10 & 4/11—We tried to clarify above reports but could not get proof that the uniform price existed. Detroit solicited several Anaconda and Kaiser jobbers who had not heard of any competitive move on either company. Discussions with Alcoa and Kaiser confirmed that no official move had been made, however, Kaiser stated that they were meeting what they saw.

[fol. 5528] 4/14—Reports from St. Paul on a published opening for municipal on 80,000 ft. of Triplex showed Kaiser direct at list less 15, Reynolds and Southern through jobber at list less 15, Alcoa list less 10 and Anaconda at list less 8.

4/14—Report from Stew Johnston on discussion with Kaiser stated that they are not disturbing contracts with unspecified balances but they are quoting lower prices on new contracts. Could not determine if "new contracts" meant extending coverage beyond June, 1958.

As indicated above, prices have definitely broken but impossible at this time to determine exact level. It would appear that competition is being met as it is seen. We have no exposure to large Bare and ACSR jobs, but rumor is that prices are off 3 to 5¢ a lb.

Since April 1st, we have met a few prices on covered aluminum, but in no case have we offered firm prices beyond June, 1958. See competitive reports attached.

4/16—Kaiser advised two Tennessee jobbers to quote list less 15 on Triplex and Line Wire with normal distributor's discounts beyond. Bare and ACSR 3 to 5¢ a lb. off the sheet, all prices firmed for 120 days.

4/17—Gib Wolfe advised that Kaiser had quoted Aerofin on rods at 31¢ a lb. This compares with our price of 33.10¢ after correction for 2¢ drop in pig. He did not know if this price was based on standard coils or a large package. A.D.R.F. expressed interest in retaining this business. Without definitely committing ourselves to this low price, I discussed this with Gib Wolfe on 4/22 and encouraged him to investigate further with the customer. He will meet with them on 4/23. We furnished Gib with pictures of the 4,000 lb. coil package and asked him to get customer's reaction.

4/17—Bill Miller reports that Anaconda extended aluminum contracts with Eastern Shore through 1958.

4/18—Ted Stokke reports that aluminum contracts with Northern States Power have been extended through 1958.

4/19—Received positive evidence that Alcoa sold jobber for a utility, Neoprene Line Wire at list less 15 and 7½, per authorization of 2/28/58.

[fol. 5529] Based on the above, we made the move as outlined in my telegram of April 22nd. A cost study based on more popular items of Triplex and Line Wire indicates that current lists less 15% is just about our cost.

Very truly yours, —, —.

JRW:reh

[fol. 5530] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 248

October 15, 1958.

Mr. R. S. Keefer, President,
The Okonite Company
Passaic, N. J.

Dear Stu:

I can well understand the good and sufficient reason for not being able to discuss the very important news released yesterday.

Congratulations to both you and Al. for the excellent arrangement you have made for your share owners. I think congratulations are due to Kennecott for acquiring such a fine organization as you and Al. have working with you.

The ranks of good independent companies are rapidly diminishing.

Please convey to Al., and the others in your fine organization, our sincere congratulations on this important step for all of you.

Kindest regards.

Sincerely, —, —, President.

ADRF/m

[fol. 5531] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 249

N. M. Kehew, Pittsburgh

November 24, 1958.
(Dictated 11/21/58)

L. T. Guess
Pittsburgh Office
Mr. T. L. Gilbert
Fabricating Division
Massena Works

Re: Covered Conductor Forecast

I am attaching a copy of a forecast of covered conductor business for 1959 which I prepared with the assistance of Mr. Kehew. This forecast may be considered conservative since I followed the graphical trends of present business conditions. It is a well-known fact that in late 1957 and the major part of 1958 there were economic factors which upset covered conductor business as well as general business. Trade papers and magazines indicate that most economists predict expanded business conditions for 1959, although there are some who feel that there will be a leveling off of business, i.e., neither a peak nor a downward trend. The graph that I used would indicate business conditions somewhere between these two.

I would like to call your attention to the last tabulation which indicates a change from open line wire for service drop to triplex and also a change from open line wire to secondary cables. When changes are being made from open line wire to service drop, I would expect the normal percentage break between neoprene and polyethylene to apply. However, when changing from open line wire to secondary cables, I expect the majority of this to be neoprene since most power companies want to maintain service at all costs on their secondaries; and neoprene admittedly will stand higher temperatures before failure than polyethylene. Another trend that may influence your selection of a [fol. 5532] twister is that of increased sizes of triplex both

for service drop and for secondary cables. I expect increased use for #2 and 1/0 for service drop and increased use of 4/0, 266,800 cm and possibly larger sizes for service cables.

I feel very strongly that cross-linked polyethylene will cut into both regular polyethylene and neoprene sales as soon as the patent situation is cleared up. Even after the patent situation is cleared up, there will be a little time lag in education of the general public; but since we are considering purchasing new equipment, I think we must take cross-linked polyethylene into consideration in our expansion plans.

L. T. Guess.

LTG:erm

cc Messrs. R. W. Knapp, Pittsburgh, J. L. Healy, Pittsburgh, N. M. Kehew, Pittsburgh.

[fol. 5533]

Covered Conductor Forecast

Peak—Fall—1959.....	800,000 Lbs.—Al.
Three-Month's Average During Peak.....	725,000 Lbs.
Mean Average at End of 1959.....	600,000 Lbs.

Polyethylene and Neoprene Requirements During Period

		Peak—800,000#	3-Mo. Av.—725,000#
Polyethylene.....	64%	510,000#	465,000#
Neoprene.....	36%	290,000#	260,000#

Line Wire and Secondary and Service Drop Cable Straight Line Projections

	Polyethylene		Neoprene	
	Peak	3-Mo. Average	Peak	3-Mo. Average
Line.....	200,000#	181,000#	92,000#	84,000#
Service Drop...	310,000#	281,000#	198,000#	179,000#

Line Wire and Secondary and Service Drop Cable Expected Change-Over from Line Wire

	Polyethylene		Neoprene	
	Peak	3-Mo. Average	Peak	3-Mo. Average
Line.....	180,000#	163,000#	80,000#	73,000#
Service Drop...	330,000#	299,000#	210,000#	190,000#

[fol. 5534] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 250

Internal Correspondence

Jan. 30, 1959.

From: F. L. Magee, Pittsburgh Office
To: Mr. P. T. Coffin, Pittsburgh Office
Re: Accurate Insulated Wire Corporation (Johnson Machinery Company—Newark, N. J.)

Attached is Mr. Joseph Leonard's letter of January 26th, which is self-explanatory. Mr. Leonard had previously phoned me as a result of his reading about our acquisition of the Rome Cable Corporation. He said his company had exclusive rights to the sale of the Accurate property and equipment for the production of insulated electrical conductors.

I inquired as to the reasons for this company being sold, and he said that it came out of a family squabble. As I get it, some of the older generation passed away and the younger generation could not get along. As a result, he said the plant had been shut down for six months.

I don't know whether the plant is for sale as is, or whether some of the equipment could be purchased separately. If we are interested, of course, Mr. Leonard seems to be the man to reach.

I am also sure that it will be obvious to you there could be some interest on the part of the Rome Cable Corporation, and if they do not already know about it, you might want to pass the information on to Ross Fraser for whatever it is worth to him.

F. L. Magee.

FLM:RAH

Cc—Mr. R. V. Davies, Mr. J. P. Haight.

[fol. 5535] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 251

Internal Correspondence

February 2, 1959.

From: Philip T. Coffin
Pittsburgh Office
To: Mr. T. O. English
Pittsburgh Office

Re: Accurate Insulated Wire Corporation (Johnson
Machinery Co.—Newark, N. J.)

I attach to this letter Mr. Frank L. Magee's letter of January 30th to me, a letter dated January 26th, 1959 to Mr. Frank L. Magee from Mr. Joseph Leonard of Johnson Machinery Company, and a notice of sale of the equipment together with a brochure describing the equipment in the Accurate Insulated Wire Corporation at New Haven, Connecticut.

We had known for sometime that Accurate Insulated Wire Corporation was out of business, but we were not aware of the fact that the equipment was for sale.

I can see how there might be a very good possibility that after we acquire Rome Cable Corporation, certain of the equipment in Accurate Wire might be very useful in expanding certain of our operations or be useful for cannibalizing such equipment when and if we and Rome Cable appraise our joint manufacturing assets. I suggest, therefore, that the proper person in our Purchasing Department write Mr. Leonard a letter phrased in such a way as to not stir up the animals particularly, but to keep Johnson Machinery Company "on the hook" to some extent until after the Rome acquisition will have become a *figurer complet*, and after which time we can sit down with the Rome Cable people and look into the matter with a much more practiced eye than ours.

Perhaps you do not agree with this procedure. If not, of course, I shall be glad to discuss the matter with you, but

in any event the letter to Mr. Magee deserves a prompt answer.

Philip T. Coffin.

PTC:ags

CC: Mr. F. L. Magee, Mr. R. V. Davies, Mr. J. P. Haight.

[fol. 5536]"

For Sale

Complete rubber & plastics insulating wire plant: Ready to go, set up to manufacture all types of rubber & plastics wire. Underwriter Laboratories Approved products.

Machinery Consists of:

4½" Davis CV Unit with capstan & dual reel take-up,
3½" Royle CV unit with capstan & dual reel take-up 60"
Rubber Mixing Mill, 60" rubber warm up mill, 4½" Hartig
Strainer, 3¼" Hartig Electrically heated plastics extruder
with capstan & dual reel take-up, 2 Entwistle labeling machines with spark testers, payoff stands and rereelers, laboratory test equipment, respooling and rereeling setups, 24 carrier Wardwell braiders, 16 carrier braiders, twiners, twisters, coilers, pay-off stands, spark testers, productometers, rubber cutters, grinders, maintenance machine shop, Ingersoll Rand air compressors, 75 HP steam generator. Buildings have approximately 50,000 sq. ft. of well maintained floor space, good labor market.

Can purchase with or without real estate.

Do you have or know of a small wire drawing or wire insulating plant for sale? We have a ready customer who desires a small operation?

We are always interested in buying individual machines for the wire industry.

Call Joseph Leonard.

Johnson Machinery Company, 683 Frelinghuysen Avenue, Newark, New Jersey, Bigelow 8-2500.

[fol. 5537]

February 4, 1959.

T. O. English
Pittsburgh Office
Mr. P. T. Coffin
Pittsburgh Office

I am enclosing an extra copy of this letter in case you need it in connection with advising Ross Fraser as to the status of this situation from our standpoint.

T. O. English.

TOE:bw

[fol. 5538] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 253

April 30, 1959.

Mr. Dixon Lewis
Pittsburgh
Philip T. Coffin
Pittsburgh Office
Mr. L. P. Favorite

Pittsburgh Office

Re: J. R. Richards Company, Carnegie, Pennsylvania

Mr. Hack McCullough invited Ralph Davies and me to have lunch with him about two weeks ago, and it turned out that he was interested in two subjects. One was the proverbial request that we look into giving McCullough Electric an exclusive Alcoa distributorship for its electrical products. This, of course, was pushed off as in the past.

The second subject, however, was of an entirely different nature. Hack pointed out that J. R. Richards Company was a manufacturer of steel conduit boxes and associated fittings such as nipples, nuts and washers. It is a family owned affair and one which he felt could be purchased at a very reasonable price. He added that he was drawing it to our attention because he felt sure that Alcoa would be in the business of making aluminum boxes and associated

fittings and that the acquisition of J. R. Richards would be by far the best and quickest way for Alcoa to get into the business.

I have looked into the matter somewhat and find that J. R. Richards is indeed a closely held family affair. Mr. J. R. Richards, who Hack says is in his sixties and probably about ready to retire, is president. Mrs. J. R. Richards is secretary and Mr. J. R. Richards' brother, Harry Richards, is sales manager. A Mr. Charles Crouch is treasurer. The company was formed about ten to twelve years ago with capitalization of \$150,000.00—1,500 shares at \$100.00 each. The report I saw did not state whether all of the stock had been issued. In 1958 sales were about \$1,000,000.00, and earnings are reported to be satisfactory since the company's [fol. 5539] inception. It has a net worth of about \$250,000.00.

The company has its main plant in Carnegie—a rather neat operation that I drove by a few days ago—and another operation of some sort on the outskirts of Bridgeville which I have not yet seen. Hack has been after me several times to know what action Alcoa proposes to take and states that if we do not buy the company, it will either be sold to someone else or be dissolved.

Dixon Lewis and I are both seeking the best advice we can as to what recommendation should be made in regard to such an acquisition. The purpose of this letter, therefore, at the moment is purely informative, and I hope to have recommendations ready within a week or so.

I have discussed this matter briefly with Mr. Hickman. In his opinion if we were to make this acquisition it would not prejudice our acquisition of Rome Cable Corporation with the Department of Justice, both because the company is small and has virtually nothing in common with either Alcoa or Rome Cable Corporation.

Philip T. Coffin.

PTC:sgs

CC: Mr. F. L. Magee, Mr. R. V. Davies, Mr. R. B. McKee,
Mr. L. E. Hickman, Mr. Dixon Lewis

[fol. 5540] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 254

May 1, 1959.

Leon E. Hickman, Pittsburgh
Mr. F. L. Magee, Pittsburgh

Legal

A telephone call with Ross Frazer yesterday afternoon disposed of Narragansett Wire Company. He thinks very poorly of the company whether directing his thoughts to equipment, policies or personnel, and has the hope that somebody will buy them to clean up a mess. Obviously, that somebody should not be Alcoa.

Mr. Fraser confirmed his intention of being in Pittsburgh on Wednesday and Thursday, May 6 and 7, and expressed the hope that he might see each of those to whom a copy of this letter is being sent, in addition to his scheduled meeting with you.

I am having Herbert Bergson in Pittsburgh on Thursday morning and would like to preempt about an hour of Mr. Fraser's time in the middle or latter part of that forenoon.

Leon E. Hickman.

LEH:frl

cc: Mr. M. M. Anderson, Mr. R. B. McKee, Mr. A. P. Hall,
Mr. N. R. Althausen, Mr. E. B. Wilber.

[fol. 5541] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 257

G. L. McCutchan,
Rome Cable

July 8, 1959.

C. L. Kessler
Metallurgical Dept.
Massena Fabricating Works
Mr. A. G. Church
Pittsburgh Office

Re: Copper-Coated Aluminum Wire

On June 23 Messrs. W. F. Lowry and John Havrila visited Massena for the purpose of discussing what we could do to provide samples of insulated bunched conductors for trials at the American Insulated Wire Corp., Division of Leviton Mfg. Co. During their visit they spotted some of the copper-clad EC wire fabricated by cold drawing copper tubing over EC rod.

Mr. Ben Leviton has been interested for some time in such a product for application in the missile field where reduction in weight is of considerable importance. Another requirement for this application is the ability to readily solder joints.

I suggested Mr. Lowry write to Messrs. Miller and Coffin and acquaint them with this potential application. A copy of Mr. Lowry's letter of July 1 to Mr. Miller is attached. Leviton would be interested in purchasing 5/16" dia. redraw rod for their wire drawing operations at American Insulated Wire Corp.

On July 1, I discussed the possibilities of making this product with Mr. George McCutchan, Director of Research, of the Rome Cable Corp. I suggested that we employ 4" dia. copper tubing filled with EC molten aluminum. The thickness of the copper cladding would be approximately 10% of the cross-sectional area. These copper clad EC billets could then be heated to approximately 950 Degs. F. and rolled into 5/16" dia. redraw rod on the Rome Mill. Mr. McCutchan indicated that the length would have to be

held to a maximum of about 40" to fit their furnace equipment which normally operates at 1750 Degs. F. He was [fol. 5542] dubious about their ability to roll such a combination at 950 Degs. F., but agreed to review the matter with the rest of their organization and let me know whether such a trial could be conducted at Rome.

Since copper seriously contaminates our rolling and drawing equipment, resulting in numerous embedded particles of copper in the subsequent aluminum production, it seems desirable to consider the fabrication of this item at Rome where copper is rolled and drawn on a routine basis.

Assuming Rome is agreeable to a trial of this product, Massena will be glad to procure the necessary copper tubing and fill it with molten EC. I will keep all concerned advised when I hear from Mr. McCutchan.

CLK:B

C. L. Kessler.

cc: Messrs. David B. Miller, Pgh., P. T. Coffin, Pgh., E. C. Hartmann, ARL, New Kens., R. R. Cope, Pgh., G. L. McCutchan, Rome Cable, N. B. Lane, L. H. Arbegast, C. B. Travis, Jr.

[fol. 5543] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 258

To: All Salesmen

From: D. H. Thayer-Rome

Date: December 8, 1959

Subject: Aluminum Building Wire

You have received Distributors' net price lists on items of Aluminum Building Wire and published list price sheets are now ready for distribution to the trade. The issuance of these price lists signals our entry into the insulated aluminum conductor market *to the extent of the building wire types of construction*. Specifically this activity is to include, and currently be confined to the following types:

Type RHW—Braided

Type TW

Type SE, Style U

Type RHW—Neoprene, Style RRD

Kaiser and General Cable have published list prices in the hands of the trade and it is my belief that Anaconda will, also print sheets. Published Distributor's discount is 20 per cent. However, in meeting the present competitive practice applying to copper conductors you may quote Distributor's discounts of 20 and 5 per cent for outright purchase.

Branch Circuit Sizes

You will note that our published list prices for Types RHW—Braided, TW, and RHW—Neoprene, RRD cover sizes *6 Awg. and larger only*. This is by design. Our attitude toward branch circuit sizes 12 Awg., 10 Awg. and 8 Awg. will be one of sales resistance. It is not our intention to publish prices for this sizes. Stocks of these small sizes will not be maintained and we have no desire to solicit or accept orders for them. I believe it is generally acknowledged that no real economy results from the use of aluminum conductors in branch circuit sizes and that you will find our attitude in this respect in keeping with that of competition.

Maintenance of Stocks

It will not be our policy to consign insulated aluminum conductors in the Building Wire types referred to above.

A Rome factory stock of aluminum Type SE, Style U Service Entrance Cable has already been authorized. Similarly, stocks of Types RHW—Braided, TW and RHW—Neoprene, Style RRD will be authorized for regular maintenance at the factory.

We recognize the fact that stock availability at Stock Redistribution Points will be essential in the sale of aluminum Building Wires. However, we have no good criteria for the establishment of such stocks. Proper stock quantities and sizes will be indicated only by experience and will depend upon the extent to which copper conductor sales are [fol. 5544] converted to aluminum. Therefore it is asked that each Stock Redistribution location make the best possible analysis of its expected aluminum activity before entering stock requisitions on the factory. In placing stock requisitions we beseech your best judgment with regard to sizes and quantities ordered.

Based upon present Mill Condition, it probably will be some 7 or 8 weeks before stock becomes available here at the factory.

Our entrance into the aluminum Building Wire field implies, of course, the availability of promotional literature, technical assistance, conversion information, etc. These matters are now in the planning stage and will become a part of an aggressive building wire conversion program as time goes on. They will be developed and put into your hands as quickly as possible.

I should like to add that our activity and interest in the aluminum Building Wire field will be considerably influenced by the degree of stability (or lack of it) applying to present price levels. You are familiar with the reason for our past reluctance to participate in it.

Very truly yours, —, —.

DHT:reh

[fol. 5545] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 259

September 10, 1959.

H. J. Fahrney, Pittsburgh Office
Mr. F. W. Conrade, Atlanta Sales Office

Re: Southwire Corporation

In a recent conversation you asked if Alcoa can offer this company a hot metal contract for 1,500,000 pounds per month. At that time I indicated that I was quite sure that this would not be possible. I have since talked with several people in Pittsburgh and find that there are several reasons why a contract of this kind cannot be offered to Southwire. Will you please let us know their comments when you inform them that this cannot be done.

At the same time you also asked whether we can guarantee a maximum iron content of .12% in the 99.5 grade pig we are shipping to them. We have examined the analysis reports of recent shipments and find that we have actually

2362

shipped them some metal with not over .12% iron, but in every case this was done to meet a delivery schedule requested by them. We cannot agree to a maximum iron content of .12% but Mr. Ferguson is making a further study of the grades of pig available to determine whether it is possible to guarantee a slightly higher average iron content, possibly between .15 and .20%. As you know, we now guarantee only that the maximum iron will not exceed .20%. We will let you know about this in a day or two.

H. J. Fahrney.

HJF/mht

cc: Messrs. L. P. Favorite, G. B. D. Peterson, R. T. Ferguson.

[fol. 5546] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 261

February 9, 1960.

Leon E. Hickman, Pittsburgh Office
Mr. A. D. R. Fraser,
Rome Cable Corporation, Rome
Mr. Samuel A. Rea,
Rea Magnet Wire Company, Inc., Fort Wayne

Legal

Re: Surprenant Mfg. Co., Clinton, Massachusetts

Will you please review the attached material and let me know whether either of you feels that Alcoa should be interested. We shall not give consideration to the matter here unless one or both of you strongly urges to do so. Even then, legal considerations may be a complete barrier.

LEH:jec

Leon E. Hickman.

[fol. 5547] IN UNITED STATES DISTRICT COURT

2363

PLAINTIFF'S EXHIBIT 263

REQUEST FOR AUTHORIZATION

204700

Date, April 15, 1960

Req. No. RC-33

Auth. No. RC-31027

RCHE CABLE CORPORATION
Name of Company

ROME, NEW YORK
Works

L. H. Kunkin
Pittsburgh Routing
1 *H. B. Gordin*
2 *W. H. Thompson*
3 *Sam E. H. H. H.*
4
5
6
7
8 *H. R. Altkamer*
9 *E. A. Vaughn*
10 *E. H. H. H.*

Request is hereby made for Authorization to make expenditures herein described:

Brief Description

P. Chase
INTERSTATE CABLE ASSEMBLY EQUIPMENT

Estimate

Total Cost \$130,000

Less Materials on Hand

Less Burden

Estimated Cost \$130,000

Date

Works Manager

4/15/60
Date

W. H. H. H.
President (of Subsidiary Co.)

Date

General Manager of the Division

Pittsburgh Office

Approval of this request is hereby recommended.

Date *4/20/60* *H. B. Gordin* Date

Date *4/20/60* *J. H. H.* Date

Date *4/20/60* *W. H. H.* Date

Date Date

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Pittsburgh Office
Accounting Department

RECEIVED

APR 20 1960

N. R. A.

FINAL APPROVAL

Date

4/20/60

J. H. H.
Vice-Pres. A.C. of A.

PITTSBURGH OFFICE USE ONLY

When completed, the cost will be charged in approximate amounts as follows:

Date *4/20/60*

[fol. 5548]

READ CAREFULLY INSTRUCTIONS ON PAGE FOUR

Give the reasons for the expenditure, detailed description of the work to be done, and what will be accomplished thereby.

[fol. 5549]

RCR-35
4 15 60
Page 3

2365

INTERSTATE CABLE ASSEMBLY EQUIPMENT

This equipment includes:

3 Planetary Cables

Curing oven - walkin type

Striping tower

Lab type rubber mill

All molds

Deep freeze - cycling type at -40° C.

Assembly benches - all steel

Assembly fixtures - movable steel type

All tools - injection guns- soldering irons- hand tools

2 large payoff stands

Hot stamping equipment - 2 electrically controlled

Cable testing equipment

1 Autoclave

1 Jacketing gun - for blown-on jackets

2 Small spoolers

2 Hot presses - for molding


1 Injection press

All supplies on hand used in assembly business

All desks - drafting tables - calculators, etc.

TOTAL: \$ 130,000.

Note: The cost of dismantling, moving and reinstallation has not been estimated. A Request for Authorization covering these items will be submitted as soon as a reasonably accurate estimate or bid has been received.



RCR-1

1-1-59

P-1

INTERSTATE CABLE ASSEMBLY EQUIPMENT

This Request for Authorization covers the purchase of equipment for the assembly of missile type cables including stripping of individual insulated conductors, cabling, jacketing of the cable and attaching mechanical and molded types of cable connectors.

This equipment is now owned by the Interstate Electronics Corporation, Anaheim, California. This company has decided to cease manufacture of these cable assemblies and has agreed to sell this equipment to us.

The acquisition of this equipment will make it possible for us to offer complete cable assemblies to the missile industry. As the manufacturer of these complete cable assemblies the users will have a reliable source of supply and a source which accepts total responsibility for these complex assemblies. The present normal arrangement is for the assembly companies to purchase the cable from a wire company, and purchase and attach the connectors. This arrangement presents a condition of divided responsibility as far as the users are concerned.

Trade sources indicate increasing interest in cable manufacturers getting an arrangement with cable assemblers. We also understand that there has been interest in acquiring their own assembly facility.

Increasing importance of the use of wire and cable for the missile industry has been a matter of interest to us for a number of years. We had another concern called to our attention and carefully investigated the potential purchase, which of course could not be done with the present suit hanging over us. Rome has been penalized in obtaining bulk orders. We have tried, and are trying, arrangements with two cable assemblers but the results have not been ^{as} satisfactory as we had hoped. The final establishment of a uniform specification on base construction of bulk cable further emphasizes importance of a producer-assembler connection. The purchase and use of this equipment should materially increase Rome Plant's production as a supplier of the

assembly plant. The equipment herein to be purchased was that of a company with whom we had contractual relations to apply connectors to bulk cable. Their decision to go out of this business was largely influenced by the standardization of specifications on bulk cable, which left them without a direct source of supply. In their going out of the cable assembly phase of their business it is possible for us to make purchase of their equipment and set it up as our own. Decision on this matter was arrived at after very careful exploration and discussion with both sales and technical people. Both Messrs. Holston and Williamson made strong recommendations towards our doing something to fill in the gap in our ability to properly serve the missile industry. The equipment has been examined by Glenn Koger, Ross Fraser, Robert Bell, and U.S. Warren and we now have in our sales office in Los Angeles the man who formerly managed this operation.

It is anticipated that our monthly sales of these assemblies will approximate \$150,000 and in addition our volume of individual insulated conductors manufactured in Rome will be increased accordingly. As this equipment lends itself to manufacture of prototype assemblies we will be in good position to obtain major orders for new construction as they are developed.

It is intended to lease approximately 20,000 sq. ft. of floor space in a building located near Los Angeles warehouse for this operation if this Request is approved.

4/19/60

Mr. Fraser assures me that this assembly equipment is exactly what Rome needs to do an effective job in missile-type cables. The Interstate Electronics Corporation has closed down its cable division and its equipment is for sale. A detailed list will be given to Mr. Fraser later and he will make a bid on the basis of this general authorization. If you have any questions I suggest that you telephone Mr. Fraser at Rome and clear the matter promptly. I shall be out of the city for two weeks after this week and I am most anxious to have this Request for Authorization cleared before I leave if we are going to approve it. It seems to me that we have little choice but to follow Mr. Fraser's advice in an item of specialized equipment such as this.

LEON E. SHUMAN

2369

[fol. 5533]

This Copy for

AUTHORIZATION

No. RC-34029

MR. P. H. LARSON

ALL PURCHASE ORDERS, IN-
VOICES, SHOP ORDERS, AND
PURCHASE REQUISITIONS
MUST CARRY THIS NUMBER.

This AUTHORIZATION confirms REQUEST FOR AUTHORIZATION No. RCR-35

Dated April 15, 1960

ROME CABLE CORPORATION
(Name of Company)

ROME
(Works)

An expenditure in the amount of \$ 130,000. as covered by REQUEST FOR AUTHORIZATION of the above number, has been duly approved.

Brief description of the project:

Purchase Cable Assembly Equipment.

I hereby certify that REQUEST FOR AUTHORIZATION bearing request number noted above has been duly approved and is on file in the Fixed Capital Division of the Accounting Department. This expenditure should be charged as follows:

CHARGE to Fixed Capital.

N. R. ALTHAUSER, Controller

Date April 22, 1960

By P. H. LARSON

Copies of this AUTHORIZATION have been issued to the President, Treasurer, Chief Engineer, Director of Purchases, Controller and Messrs. R. A. Hunt, I. W. Wilson, H. C. Erekinge, L. E. Hickman, C. H. Ellis, L. B. Kuhns, L. Litchfield, Jr.

RC-34029

AUTHORIZATION NO.

Romy

Romy

Purchase Cable Assembly Equipment.

STUDY

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RCR-35

REQUEST NO.

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THORAZED

4/22/60

CHARGE: to Fixed Capital. (2)

F. I. NO.	DATE	AMOUNT	DESCRIPTION	ASSET NUMBERS
20122	12-10	100.00	Plantation etc	

T. CHARGED
FIXED CAPITAL:

TOY A:

August

130,000.

DATE COMPLETED 12/

2371

[fol. 5555]

READ CAREFULLY INSTRUCTIONS ON PAGE FOUR

Describe below the detailed estimated cost, showing separately the cost and kinds of materials, labor, expenses, etc., installation cost being shown as a separate item from equipment or structure. State in general terms the degree of accuracy of the estimate.

Date _____
 Date *1/15/60* *L.D. Little, Jr. Engr.*
 Date *1/15/60* *E. G. Quinn, Controller*
 Date _____
 Date _____

Date _____
 Date _____
 Date _____
 Date _____
 Date _____

Note:—The name and title of the person, under whose immediate jurisdiction this request was prepared, must be signed above.

{fol. 5556]

INSTRUCTIONS CONCERNING REQUESTS FOR AUTHORIZATION

(Revised as of 11-1-47)

1. All Requests for Authorization shall be made in triplicate, numbered consecutively by the Works issuing the Request, and be prefixed by the indicative letter assigned to that Works; two copies should be retained by the Works (one of which is for the Property Accountant and one sent to the General Manager in Pittsburgh having supervision of such Works, who will in turn route it to the proper people in Pittsburgh.

2. On Pages 2 and 4 of this form give an outline of the reason for the expenditure, a detailed description of the work to be done, and a summary of the objectives, as well as other information which may be requested in writing by the Accounting Department from time to time. A copy of explanatory drawings, sketches, photographs, and blue prints should be attached to and form a part of the request. On Page 3 should be shown the detailed estimate of cost for each unit of the work to be performed, broken down to show material, labor, and burden for each item in the estimate.

3. After the Request for Authorization has been duly approved, an Authorization will be issued from the Pittsburgh Office. All Authorizations will be numbered consecutively, regardless of Works submitting the Request, but the number will be prefixed by the indicative letter representing the Works which issued the Request. The Authorization will also carry, for cross reference, the Works number of the Request for Authorization.

4. If, after an Authorization is issued, changes appear to be necessary or desirable in the design, plan or scope of the work, all the facts and a new estimate in the form of a revised Request for Authorization should be prepared and submitted as outlined under (1) above.

5. If, at any time before a job is complete, it is apparent that it will require at least \$2,000.00 more than was authorized, to complete the job, a revised Request for Authorization should be submitted promptly. However, no revised Request should be submitted during the calendar month in which a job can be reported complete.

6. Copies of Authorizations are regularly sent or routed to the President, Vice-President in Charge of Operations, Controller, Treasurer, Chief Engineer, Director of Purchases, General Manager of the Division, Works Manager, Works Office Manager, and Property Accountant. Designation of other individuals to receive copies of the Authorization should be made hereunder.

The following questions shall be answered:

1. Was this item included in the Authorization Budget? No _____ Year _____ Item of Budget _____ Amount previously requested against this item _____ Amount remaining after this Request for Authorization _____
2. Estimated date work will be started? See Note _____ Completed See Note _____
3. State number of employees to be increased or decreased after this project is completed. Increase: 5 Salaries maximum 50 hourly.
4. Is any equipment or other facility being replaced? No _____ If so, will it be sold, scrapped, or transferred? What is its original cost? _____ Present Book Value? _____ If to be sold or traded in, what is estimated sales value? _____
5. Is any equipment being transferred from another plant? No _____ What is the original cost? _____ Present Book Value _____
6. What disposition will be made of spare parts for equipment being retired? Not applicable.
7. Has any work been done or material requisitioned for this job? If so, explain why. No.
8. What is your expected rate of expenditures? Total expenditure in May 1940 _____

Note: This Request covers acquisition costs only. A separate Request covering labor and materials for dismantling, moving and reinstallation will be submitted provided this Request for Authorization is approved.

[fol. 5557] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 264

March 1, 1960.

A.D.R. Fraser, Rome
Mr. R. McKee, Pittsburgh

Legal

As I told you last Friday on the telephone Lee Hickman before he left on vacation sent me the enclosed data sent to him by Ray Palmer, of the Boston office giving information regarding Suprenant Mfg. Co.

I received the data just as Lee was leaving and as I was about to leave for the Coast. We have known this Company for a number of years and hold them in high esteem. When I talked with Lee about it and I described the product to him he had considerable doubt as to the possibility of doing anything about it in view of the Justice Department's inquiry about Rome, Rea and Alcoa. We have carefully talked the matter over and reviewed their figures and while we recognize them as a "Tiffany" producer in their field, the location and duplication of equipment on many of the products from our present knowledge would indicate that our recommendation would be to turn it down.

If it is your decision that we should look further and visit the plant and do other things necessary to properly check all details we will, of course, be glad to do so.

Ross.

ADRF/m

cc: L. E. Hickman

Data returned to Bob McKee.

2374

[fol. 5558] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 265

Internal Correspondence

April 13, 1960.

From: A.D.R. Fraser, Rome
To: Mr. L. E. Hickman, Pittsburgh

I am sorry that because of activities that you know about, that the Hitemp data was not returned earlier. I actually carried it to Pittsburgh last week, and had it with me at Ft. Wayne, but did not get a chance to talk about it. Certainly what has happened in the action of the Department of Justice in itself makes the decision quite definite that we cannot do very much about this at the present time. Chief Wilson has already had from Jack the opinion of our technical people and I have gone over it with him and I concur.

I have not returned the copy of the Eberstadt letter as I believe this was merely a photograph of the original letter to Frank Magee, but I will be glad to do this should you wish it.

A.D.R. Fraser.

ADRF/m
encls.

[fol. 5559] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 266

April 20, 1960.

Leon E. Hickman
Pittsburgh Office
Mr. Ray E. Palmer
Boston District Office

Legal

Re: Surprenant Manufacturing Co.

I note your letter to Mr. McKee under date of March 21st and had a chance to talk to Mr. Fraser yesterday concerning the captioned matter. If and when Messrs. Fraser or Williamson are in the vicinity of Boston, I am sure they would be glad to talk with Mr. Surprenant. However, the pending antitrust suit against the company for the purchase of the Rome assets makes it out of the question to consider any further corporate acquisitions, particularly in this field, as long as the antitrust action continues. Unfortunately, it is more likely to last several years than several months.

Leon E. Hickman

LEH/jws

cc: Mr. R. B. McKee, Mr. A. D. Ross Fraser, Rome, Mr. R. L. Williamson, Rome.

PLAINTIFF'S EXHIBIT 267

August 22, 1960.

G. L. McCutchan
R. A. Schatzel

Re: SPT Cords With Aluminum Conductors

Purpose:

To develop SPT Cord with aluminum conductors and to study the possibilities of the use of aluminum for this application.

Discussion:

The use of aluminum for the conductors of flexible cords would provide an outlet for considerable quantities of aluminum if it could be proven satisfactory for this service. Alcoa has been working for quite some time with the American Insulating Company on the development of SPT Cord with aluminum conductors but the results have been somewhat less than satisfactory because of their inability to work closely enough with them to determine the problems involved in the manufacture of this product. The problem was, therefore, given to Rome Cable to determine if aluminum conductor SPT Cord could be economically produced and to investigate the possibilities of the use of aluminum for this application in comparison to the present U/L approved copper conductor SPT Cord.

Summary:

Samples of #16/2 and #18/2 conductor cord were produced. A preliminary study of costs indicates that a #16 aluminum conductor cord can be produced at a cost equal to or lower than the cost of a #18 copper conductor cord. The question was raised and tests were conducted which show that for this application, the aluminum equivalent may not need to be two AWG sizes larger than copper. If this is true, it would be a further cost advantage in favor of aluminum.

[fol. 5561] A comparison of the performance characteristics of aluminum conductor cord with copper conductor cord shows the aluminum to be relatively poor. The strength of the #16 conductor cord is approximately 75% that of the cord with #18 copper conductor and its flex life is roughly $\frac{1}{3}$ that of copper. Underwriter's Laboratories have expressed themselves that for aluminum to be considered for this application, it should perform better than 50% as well as copper.

Procedure:

Sample Development

Wire Drawing—At the start of this investigation it was assumed that the .010" aluminum wire for stranding would be drawn at Rome. Several attempts were made to draw this on the old Rome fine wire drawing machines which had been set up for this purpose. After a considerable amount of work and investigation it was concluded that these machines were unsuitable due principally to slow drawing speed and excessive breakage. .010" EC H-19 wire became available from Massena and wire from this source was used for most of the samples produced. The cost data for drawing .010" wire at Rome, which is shown later in this report, is based on providing Vaughn Ring Blox fine wire drawing machines and assuming that one operator could operate five machines.

Stranding—The .010" wire was bunched before annealing to take advantage of the greater strength of the hard drawn wire. Stranded conductor for the original samples was produced on a New England Butt buncher. After the Cook buncher from Massena became available, all strand was bunched on this machine as it was considered much more suitable. To avoid excessive breakage of the individual wires, the bunching speed was reduced to 50% of [fol. 5562] that used for bunching copper strand. At this speed there were relatively few breaks, but as the machine is not equipped with automatic stops, whenever a break did occur there was a loose end in the strand.

Annealing—The stranded conductor was annealed to $\frac{1}{4}$ hard temper.

Retipping—The aluminum strand was not retipped before insulating as is the practice with copper strand. Previous experience had shown that bunched aluminum strand is easily damaged by respooling, resulting in broken wires which cause "bird nesting" and conductor breaks at the insulator. Additional study of this problem is necessary.

Insulating—Samples of #16/2 and #18/2 were produced without separator and with paper fold separator. Lengths ranged from 1000 Ft. to 2500 Ft., it being impossible to obtain longer lengths because of "bird nesting" and conductor breaks caused by the loose ends of broken wires in the strand. The samples with paper fold separator were run for two reasons. It was thought that the use of a separator might solve the conductor breakage problem, but this did not prove to be true. It was also desired to obtain performance test data on the finished cord both with and without separator.

Samples and Preliminary Cost Data

Sample	Size	Strand	Insulated	Cost/M'
1	#18	16/.010" *	126" x 227"	\$ 7.38*
2	#18	16/.010" **	126" x 227"	6.72
3	#16	26/.010" *	148" x 257"	10.18
4	#16	26/.010" **	148" x 257"	9.09
5	#16	26/.010" paper fold *	151" x 263"	10.42
6	#16	26/.010" paper fold **	151" x 263"	9.31
7	#18	42/34 bare copper	126" x 227"	9.36

* .010" EC H-19 purchased from Massena.

** 3/8" rod purchased from Massena and drawn to .010" at Rome.

[fol. 5563] Tests:

Overall Strength Test—Samples of the finished cord were broken on the Scott rubber tensile testing machine. The results are the average of three tests.

Flexing Test—Samples were flexed on the Bureau of Mines Flex Testing Machine through an arc of 180° under tension of a six-pound weight. Results are the average of three tests.

Twisting Test—Samples were subjected to a twist test using the U/L twist testing machine for heater cords. Results are the average of three tests.

Results:

Sample	Lbs. Break	Flexing Test Cycles to Failure	Twisting Test Cycles to Failure
# 16 26/.010 SPT-1 Al. Condr.....	67.5	55	24
# 16 26/.010 SPT-1 Al. Condr. with paper sep.....	68.0	74	33
# 18 16/30 SPT-1 Al. Condr.....	39.0	43	16
# 18 42/34 SPT-1 Copper Condr.....	90.0	369	90
# 18 16/30 SPT-1 Copper Condr.....	88.0	220	65

The use of aluminum conductor in flexible cords was discussed with the Underwriter's Laboratories to obtain information regarding tests and test requirements that would be involved to obtain U/L approval. They seemed convinced that EC grade aluminum would not be suitable for this service. The proposed test program which was developed previously for American Insulated and Alcoa and which would be followed if we were to submit was reviewed.

a. Breaking strength would be compared with copper. The tensile would be made on uninsulated strand.

[fol. 5564] b. A complete study of the soldering techniques would have to be made in view of the fact that aluminum is reportedly much more difficult to properly solder than copper. In addition there would be a test on the flexibility of the soldered joint.

- c. A current flow test through soldered joints would be made which would be for roughly 60 days with a predetermined amount of current flowing. Following the current test the tensile strength of the joint would be made.

d. A thorough study of the compatibility of insulating materials with the various soldering fluxes that might be used would have to be made.

e. Various flexibility tests in comparison with #18 AWG copper would be made. These tests conceivably could range from a simple twist with pliers to the more complex cable flexing machines that we have. A lateral loop test would be involved here also, which is simply measuring the number of cycles taken to break the conductor when two points of the conductor are held a distance of 12 inches apart and these points brought together and separated. This again would be compared with copper.

f. The effects of corrosion on aluminum conductors under various atmospheres would be investigated.

g. The impact test would be made as well as the standard crushing test.

In all the above tests they did feel it reasonable to expect that aluminum would do at least half as well as the results on copper. Up to this point their limited investigation indicates that aluminum is roughly about $\frac{1}{3}$ that of copper with regard to flexibility. Out test results confirm this also.

[fol. 5565] Conclusions:

1. Samples of aluminum conductor SPT-1 cord have been produced with a limited amount of success. It is believed that considerable improvement can be made but that EC grade aluminum will always be a problem from the standpoint of conductor breakage at the insulator. Breakage is no problem with copper conductor.

2. Performance tests show aluminum conductor cord relatively poor in comparison to copper. Improvement in this respect will be necessary before consideration can be given to submitting to the Underwriters.

3. The preliminary cost data indicates that it would be possible to produce the aluminum conductor cord at equal or lower cost as compared to copper conductor. This, of course, would depend on how successful we might be in overcoming strand breakage as production loss from this cause is not reflected in the costs shown here.

G. L. McCutchan.

GLM:hh

[fol. 5566] To: G. L. McCutchan

Could we incorporate reinforced strand to meet U/L tests? Maybe one (or few) strand(s) of stainless or aluminoweld would do the trick.

E.K.D.

[fol. 5567] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 268

ALCOA

First in Aluminum

Aluminum Company of America
1501 Alcoa Bldg., Pittsburgh 19, Pa.

News Release

For Further Information: Laurence S. Sewell, Jr.,
ATlantic 1-4545, Ext. 2861

For Release Friday, January 20, 1961,
Or Anytime Thereafter

East Los Angeles, Calif., January 20, 1961—Expansion to meet the growing and complex needs of the missile, rocket, and electronic instrumentation fields was announced today by the Rome Cable Division of Aluminum Company of America.

A. D. R. Fraser, Rome Cable president, said that the division has established new electrical cable production facilities, geared to these "markets of tomorrow," in a new plant here.

Called the Special Products Facility, the new production unit is now in operation. Its task, Mr. Fraser said, is custom fabrication of cables and cable assemblies, to customer specification, utilizing the full capabilities of Rome Cable.

Specialized equipment of the new unit permits a wide range of complex and highly specialized electrical cables and assemblies. Among its capabilities: single cables measuring up to four inches in diameter; cables consisting of as many as 330 separate conductors; incorporation of special connecting devices reliable under severe environmental conditions; and unusual configurations of cable, suitable for the rigid requirements of space craft and ground support equipment.

[fol. 5568] As a part of the Rome operation, the new plant offers particular advantages to its market. A coordinated

source of supply, it provides complete responsibility and quality control from raw material to finished product.

The new Special Products Facility is located in a new building in the east Los Angeles area, which also houses Rome's regional warehouse. The location places the plant close to Southern California's high concentration of aircraft, missile, and electronic industry centers.

Mr. Robert D. Golly has been assigned as general manager of the new facility.

[fol. 5569] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 269

Internal Correspondence

July 31, 1959.

From: R. W. Knapp
Pittsburgh Office

To: Mr. D. R. Little
Massena Works

Re: R/A M-2520—Neoprene Equipment R/A M-2523—
Twister & Rewind Unit

Attached you will find the above captioned requests for authorization that you requested to be canceled in your letters of July 27 and July 28 to Mr. J. R. Pellegrino.

R. W. Knapp.

RWK:es

cc: Mr. J. R. Pellegrino—Massena Works, Mr. N. B. Lane
—Massena Works.

IN UNITED STATES DISTRICT COURT

[fol. 5570]

PLAINTIFF'S EXHIBIT 270

Request for Quotation

FROM: Boston DISTRICT: INQUIRY NO. BB 2383
 TO: CENTRAL QUOTATION DEPT., ROME, N.Y. DATE: November 7, 1960
 INQUIRY FROM: Boston Edison Co. Req. # 133052
 (Mr. A.W. Sullivan)
 FOR SHIPMENT TO: _____

— THE FOLLOWING MATERIAL —

Please let us have a quotation - bid due on or before
 November 14 - on the following:

10,000 ft. Line Wire
 #1/0 A.G. - copper - neoprene covered (#1/0)
 in accordance with Spec. 32.4-3.3
 rev. December 3, 1958 @ - - - \$163.00/ft.

Please submit alternate quotation on Aluminum equivalent

November 10, 1960

On the aluminum equivalent quote #3/0 - 7 strand aluminum, 4/64" Neoprene,
 code word "Holly" at \$98.50 M ft.

Policy 3 applies on the copper item. Policy 1 applies on aluminum item.

F.O.B. Destination

TERMS: 1/2 of 1% on copper

Net 30 days on aluminum

SHIPMENT: 5 weeks plus test report time if required.

B.A. Dunn:mab

TERMS: Standard discount dates apply
 of 1% 2% Other _____
 Payment if other than mill condition sheet
 B Destination unless otherwise noted

Distributor Comm. if any
☐ Net ☐ 5% Other _____

☐ Competitive Report
 Requested

District Office Note That All Inquiries Must Contain All Necessary Data Including the Following Details Wherever They
 Are Applicable

1. Size and Stranding
2. Temper
3. Number of Conductors
4. Voltage, if other than 600
5. Type of Insulation

6. Type of Sheath, Jacket, or Covering
7. Finish
8. Lengths and or Pull-up Required
9. Any Special Specification Requirement or Application
10. Delivery Desired

November 14, 1940

Boston Edison Company
Purchasing Department
182 Tremont Street
Boston 12, Massachusetts

Attention - Mr. A. W. Sullivan
Purchasing Agent

Gentlemen:

REQUEST NO. 194012

In reply to your request of November 4, we wish to
submit our quotation as follows:

60,000 ft.	#1/0 Copper Neoprene covered Line Wire in accordance with Spec. E2.4-3, rev. December 3, 1938	\$163.00 N. ft.
<u>Alternate:</u> 60,000 ft.	#3/0 7 strand Aluminum, 4/64" Neoprene cable word "HOLLY"	\$ 98.50 N. ft.

F.O.B.

Destination

Shipment:

5 weeks - plus test report time, if required

Cash Discounts:

Copper Item - 1/2 of 1% 10 days; - Net 30 days

Aluminum Item - Net 30 days

Copper Item: All shipments will be invoiced at the prices stated
herein except for adjustment either upward or downward for the
producers price, if stated on date of shipment. These prices
are based on copper at 30.00¢ per lb. Should shipment be deferred
by the customer beyond 6 months after date of order acknowledgment
shipments will then be invoiced at the Company's price in effect
on date of shipment.

Aluminum Item: All shipments will be invoiced at the Company's price
in effect on the date of shipment.

Reels will be billed extras. Full credit will be allowed on return
of empty reels, if in good condition, within 12 months, to our factory
at Rome, New York.

Very truly yours,

ALVA D. STEIN

ADS/nb

PLAINTIFF'S EXHIBIT 271
Request for Quotation

INQUIRY NO. BU 2356

FROM: Boston DISTRICT DATE: November 7, 1960

CENTRAL QUOTATION DEPT., ROME, N. Y. ORDER PROTECTION Reg. #134950

INQUIRY FROM: Boston Edison Co. Mr. A. J. Sullivan)

FOR SHIPMENT TO:

— THE FOLLOWING MATERIAL —

Please let us have a quotation - bid due on or before November 14 -
 on the following:

400,000 ft.

Line Wire

#2 AWG - copper - neoprene covered

In accordance with Spec. 62.4-3.3

Rev. December 3, 1958

@ - - - \$99.00 M ft.

Please submit alternate quotation on Aluminum equivalent

November 10, 1960

The aluminum equivalent would be #1/0 - 7 strand aluminum, 4/64" Neoprene,
 code word "Sequoia" at \$61.00 M ft.

Policy 3 applies on the copper item. Policy 1 on the aluminum item.

F.O.B. Destination

TERMS: 1/2 of 1% on the copper

Net 30 days on aluminum

SHIPMENT: 5 weeks plus test report time if required.

R.A. Dunn:mab

MS: (Standard discount dates apply) -
 of 1% ☐ 2% Other _____

Distributor Comm. if any

☐ Net ☐ 5% Other _____☐ Competitive Report
Requested

B. Destination unless otherwise noted.

Office Note That All Inquiries Must Contain All Necessary Data Including the Following Details Wherever They
 Applicable:

Size and Stranding

Temper.

Number of Conductors

Voltage, if other than 600

Type of Insulation

6. Type of Sheath, Jacket, or Covering.

7. Finish

8. Lengths and/or Put-up Required

9. Any Special Specification, Requirement or Application

10. Delivery Desired.

5572

[fol. 5573]

Copy to Mr. D. Blake Duffy

November 14, 1960

Booster Nylon Company
Purchasing Department
152 Tremont Street
Boston 12, Massachusetts

Attention - Mr. A. W. Sullivan
Purchasing Agent

Gentlemen:

REQUEST NO. 134950

In reply to your request of November 4, we wish
to submit our quotation as follows:

400,000 ft. #2 AWG Neoprene covered Copper Line wire
In accordance with Spec. 32.4-3.3 Rev.
December 3, 1958 \$99.00 M ft.

Alternate:
400,000 ft. #1/0 7 strand Aluminum 4/64" Neoprene
code word "SEQUOIA" \$61.00 M ft.

P.O.D. Destination

Shipments: 5 weeks - plus test report time, if required

Cash Discounts: Copper Item - 1/2 of 15 10 days: Net 30 days
Aluminum Item - Net 30 days

Copper Item: All shipments will be invoiced at the prices stated herein except for adjustment either upward or downward for the Producers price of metal on date of shipment. These prices are based on copper at 30.00¢ per lb. Should shipment be deferred by the customer beyond 6 months after date of order acknowledgment, shipments will then be invoiced at the Company's price in effect on date of shipment.

Aluminum Item: All shipments will be invoiced at the Company's price in effect on the date of shipment.

Reels will be billed extra: Full credit will be allowed on return of empty reels, if in good condition, within 12 months, to our factory at Rome, New York.

Very truly yours,

ALVA D. STEIN

ADS/nb

PLAINTIFF'S EXHIBIT 272

2387

April 19, 1960

G.A. BROCK

JAMES S. SCHIFFMAN

MEMO

ST. LOUIS OFFICE

REFERENCE: DOW CHEMICAL CORP.
 BATON ROUGE, LA.
CUSTOMER INV. #70070-7-11

I will list below the constructional details of all the items involved along with the alternate construction which will be the same as the construction asked for except omitting the copper drain wires. This, of course, applies only to the 15 KV items. The technical data will be listed separately.

With regard to supervision of installations, etc., advise them that we will do this free of charge providing that a reasonable amount of time is required. Just for your own information, we believe that this item of supervision may be asked for in view of the problems that were encountered on the 15 KV item a couple years back in Freeport, Texas. The items are as follows:

Item 1 - 2805 ft. - 1,000,000 C.M. - 91 strand ECM-26 Aluminum, strand shielding, 14/64" H.M. polyethylene, Dow Chemical Compound #103A1, 15 mil butyl semi-conducting bedding tape, 24 x #18 AWG tinned copper wires spirally wound and evenly spaced, .005" tinned copper shielding tape, 1-1/2" wide, 1/4 lapped, footage tape, Vinyl cable tape, 7/64" H.M. polyethylene jacket, Dow Chemical Compound Q4205.1, O.D. 2.02", weight is 2190 lbs. M ft. @ - - - - \$1680.00 M ft.

Alt.

Item 1A- Ditto except omit the copper drain wires, O.D. 1.93", weight is 1830 lbs. M ft. @ - - - - - \$1705.00 M ft.

Item 2 - 2805 ft. - Ditto Item 1 except 700 MCM - 61 strand copper, O.D. 1.83", weight is 3270 lbs. M ft. @ - - - - \$2345.00 M ft.

Alt.

Item 2A- 2805 ft. - Ditto except omit drain wires, O.D. 1.77", weight is 2935 lbs. M ft. @ - - - - - \$2150.00 M ft.

Item 3 - 17,100 ft. - 700 MCM - 61 strand aluminum, same description as Item 1, O.D. 1.83", weight is 1770 lbs. M ft.
 @ - - - - - \$1480.00 M ft.

April 19, 1940

G.A. BROCK

JAMES S. SCHWABACH

RMR

ST. LOUIS OFFICE

Page 2.

Alt.

Item 3A- 17,100 ft. - Ditto except omit copper drain wires, O.D. 1.78", weight is 1440 lbs. M ft. @ - - - \$1283.00 M ft.

Item 4 - 17,100 ft. - 500 MCM copper; otherwise same as Item 3, O.D. 1.68", weight is 2340 lbs. M ft. @ - - \$1717.00 M ft.

Alt.

Item 4A- 17,100 ft. - Ditto except omit the copper drain wires, O.D. 1.62", weight is 2230 lbs. M ft. @ - - \$1343.00 M ft.

Item 5 - 39,600 ft. - 500 MCM aluminum, ECM-26, 61 strand, strand shielding 14/64" H.M. polyethylene, Dow Chemical Compound #103A.1, 15 mil butyl semi-conducting tape, 24 x #18 AWG tinned copper shielding wires spirally wound and evenly spaced, .005" tinned copper shielding tape, footage tape, Vinyl cable tape, 6/64" H.M. polyethylene sheath, Dow Chemical Compound Q4205.3, O.D. 1.61", weight is 1313 lbs. M ft. @ - - - \$1065.00 M ft.

Alt.

Item 5A- Ditto except omit copper drain wires, O.D. 1.55", weight is 1135 lbs. M ft. @ - - - \$ 895.00 M ft.

Item 6 - 39,600 ft. - 350 MCM - 61 strand copper - Ditto Item 5, O.D. 1.46", weight is 2025 lbs. M ft. @ - - \$1440.00 M ft.

Alt.

Item 6A- Ditto except omit copper drain wires, O.D. 1.40", weight is 1870 lbs. M ft. @ - - - \$1280.00 M ft.

Item 7 - 5000 ft. - 1,000,000 C.M. - 61 strand ECM-19 aluminum, 6/64" black polyethylene, Dow Chemical Compound #303A3, O.D. 1.36", weight is 1122 lbs. M ft. @ - - \$ 505.00 M ft.

Item 8 - 5000 ft. - 700 MCM - 61 strand copper - Ditto, O.D. 1.16", weight is 2315 lbs. M ft. @ - - - 54.72c per lb.

Item 9 - 30,000 ft. - 700 MCM aluminum - 61 strand ECM-19, 6/64" black polyethylene, Dow Chemical Compound #303A3, O.D. 1.16", weight is 811 lbs. M ft. @ - - - \$ 405.00 M ft.

Item 10- 30,000 ft. - 500 MCM - 37 strand copper - Ditto, O.D. 1.03", weight is 1648 lbs. M ft. @ - - - 35.07c per lb.

45,200

A5993

April 19, 1960

2389

B.A. HENRICK

JAMES S. SCHNEPPACH

ST. LOUIS OFFICE

Page 3.

All prices are list and include the following distributor's commission:

All 15 KV items - 2-1/2%

Copper Weatherproof items - 3/4% per lb.

Aluminum Weatherproof items - 3%

TERMS: 1/2 of 1% on the High Voltage items and Copper Line Wire items.
Net 30 days on the Aluminum Line Wire items.

In accordance with their instructions, the following information is to be submitted with the bid:

Paragraph 2.7 lists Dow Compound #Q4205.3. We believe this to be H.M. polyethylene and not a PVG material as indicated in this paragraph.

In regard to paragraph i.1A. On material that is to be supported by a messenger, etc. and where there will not be any in-Tension splices, the use of BCH-26 Aluminum has been found by many industry standards to be suitable. Where in-Tension splices might be encountered, BCH-19 Aluminum has been found to be more suitable. The BCH-26 temper offers a little more flexibility and ease of handling when installing, splicing, etc. over the BCH-19 temper.

These cables can be manufactured with either temper. For line wire, we recommend BCH-19 temper. For the Power Cable to be supported by a messenger, we feel the BCH-26 temper to be better suited from a standpoint of easier handling in the field, etc.

Current Carrying Capacities - 15 KV Cables

- based on 40° ambient temp.*
- (a) 1000 MCM Alum. - 630 Amps.
 - (b) 700 MCM Copper - 635 "
 - (c) 700 MCM Alum. - 520 "
 - (d) 500 MCM Copper - 530 "
 - (e) 500 MCM Alum. - 400 "
 - (f) 350 MCM Copper - 425 "

Diameters - 15 KV Power Cables

- (a) 1000 MCM Alum. - 2.02"
- (b) 700 MCM Copper - 1.83"
- (c) 700 MCM Alum. - 1.83"
- (d) 500 MCM Copper - 1.65"
- (e) 500 MCM Alum. - 1.65"
- (f) 350 MCM Copper - 1.46"

[fol. 5577]

April 19, 1960

G.A. BRODOCK

JAMES S. SCHEPPACH

ROME

ST. LOUIS OFFICE

Page 4.

5. AC/DC Ratios of Cables

(a) Aluminum	1000 MCM	- 1.026
	700 MCM	- 1.013
	500 MCM	- 1.007
(b) Copper	700 MCM	- 1.034
	500 MCM	- 1.018
	350 MCM	- 1.009

6. Resistance (Ohms/1000 ft at 25C)

(a) Aluminum	1000 MCM	- .0181
	700 MCM	- .0256
	500 MCM	- .0356
(b) Copper	700 MCM	- .0159
	500 MCM	- .0220
	350 MCM	- .0311

7. Breaking Strength

(a) Aluminum	1000 MCM	- 12,010 lbs. Min.
	700 MCM	- 8,408 lbs. Min.
	500 MCM	- 6,003 lbs. Min. ^a
(b) Copper	700 MCM	- 21,340 lbs. Min.
	500 MCM	- 15,240 lbs. Min.
	350 MCM	- 11,100 lbs. Min.

8. Coefficient of linear expansion per degree Centigrade - Polyethylene

$$10 - 18 \times 10^{-5}$$

9. Current Carrying Capacity - Weatherproof Cables

(a)	1000 MCM Alum.	- 780 Amps.
(b)	700 MCM Copper	- 780 "
(c)	700 MCM Alum.	- 600 "
(d)	500 MCM Copper	- 610 "

10. Diameters - Weatherproof Cables

(a)	1000 MCM	- 1.36"
	700 MCM	- 1.16"
	500 MCM	- 1.03"

2391

[foE5578]

April 19, 1960

G.A. BRODOCK

JAMES S. SCHEPPACH

NME

ST. LOUIS OFFICE

Page 5.

11. Breaking Strength - Weatherproof Cables

(a) 1000 NCM Alum.	16,260 lbs. Min.
(b) 700 NCM Copper	31,150 lbs. "
(c) 700 NCM Alum	11,620 lbs. "
(d) 500 NCM Copper	21,940 lbs. "

F.O.B. Destination

SHIPMENT: Start 7 weeks, complete 9 weeks after receipt of order. I have not gone to the trouble of getting a more accurate promise as I cannot tell when this material is required.

As you know, we currently have 42,000 ft. of 1,000,000 C.M. and 13,000 ft. of 700 NCM - 15 KV being negotiated for Dow Chemical at Freeport, Texas. I don't have the advantage of knowing how our prices lined up there, but these prices are comparable to those.

We will agree to the guarantee clause as shown in their inquiry.

GAB:MAB

G.A. BRODOCK

[fol. 5579] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 273

Rome Office

April 21, 1960.

The Dow Chemical Company
 Louisiana Division
 P. O. Box 150
 Plaquemine, Louisiana

Subject: Your Inquiry No. 70090-7-L1

Gentlemen:

Thank you for your inquiry dated April 7. Quotation and technical data follows:

1. 2,805 ft.—1,000,000 C.M.—91 strand EGH-26 Aluminum, strand shielding, 14/64" H.M. polyethylene, Dow Chemical Compound #103A1, 15 mil butyl semi-conducting bedding tape, 24 x #18 AWG tinned copper wires spirally wound and evenly spaced, .005" tinned copper shielding tape, 1 1/2" wide, 1/4 lapped, footage tape, Vinyl cable tape, 7/64" H.M. polyethylene jacket, Dow Chemical Compound Q4205.3, O.D. 2.02", weight is 2190 lbs. M ft.
 @.....\$1880.00 M ft.
 Alt.
 1A. Ditto except omit the copper drain wires, O.D. 1.95", weight is 1850 lbs. M ft.
 @.....\$1705.00 M ft.
 2. 2,805 ft.—Ditto Item 1 except 700 MCM—61 strand copper, O.D. 1.83", weight is 3270 lbs. M ft.
 @.....\$2345.00 M ft.
 Alt.
 2A. 2,805 ft.—Ditto except omit drain wires, O.D. 1.77", weight is 2935 lbs. M ft.
 @.....\$2150.00 M ft.
- [fol. 5580]
3. 17,100 ft.—700 MCM—61 strand aluminum, same description as Item 1, O.D. 1.83", weight is 1770 lbs. M ft.
 @.....\$1480.00 M ft.
 Alt.
 3A. 17,100 ft.—Ditto except omit copper drain wires, O.D. 1.78", weight is 1440 lbs. M ft.
 @.....\$1285.00 M ft.
 4. 17,100 ft.—500 MCM copper; otherwise same as Item 3, O.D. 1.68", weight is 2540 lbs. M ft.
 @.....\$1717.00 M ft.
 Alt.
 4A. 17,100 ft.—Ditto except omit the copper drain wires, O.D. 1.62", weight is 2250 lbs. M ft.
 @.....\$1545.00 M ft.

5. 39,600 ft.—500 MCM aluminum, ECH-26, 61 strand, strand shielding, 14/64" H.M. polyethylene, Dow Chemical Compound #103A.1, 15 mil butyl semi-conducting tape, 24 x #18 AWG tinned copper shielding wires spirally wound and evenly spaced, .005" tinned copper shielding tape, footage tape, Vinyl cable tape, 6/64" H.M. polyethylene sheath, Dow Chemical Compound Q4205.3, O.D. 1.61", weight is 1515 lbs. M ft.
 @.....\$1065.00 M ft.

Alt.

- 5A. Ditto except omit copper drain wires, O.D. 1.55", weight is 1135 lbs. M ft.

@.....\$895.00 M ft.

6. 39,600 ft.—350 MCM—61 strand copper—Ditto Item 5, O.D. 1.46", weight is 2025 lbs. M ft.

@.....\$1440.00 M ft.

Alt.

- 6A. Ditto except omit copper drain wires, O.D. 1.40", weight is 1870 lbs. M ft.

@.....\$1280.00 M ft.

7. 5,000 ft.—1,000,000 C.M.—61 strand ECH-19 aluminum, 6/64" black polyethylene, Dow Chemical Compound #305A3, O.D. 1.36", weight is 1122 lbs. M ft.

@.....\$505.00 M ft.

[fol. 5581]

8. 5,000 ft.—700 MCM—61 strand copper—Ditto, O.D. 1.16", weight is 2315 lbs. M ft.

@.....54.72¢ per lb.

9. 30,000 ft.—700 MCM aluminum—61 strand ECH-19, 6/64" black polyethylene, Dow Chemical Compound #305A3, O.D. 1.16", weight is 811 lbs. M ft.

@.....\$405.00 M ft.

10. 30,000 ft.—500 MCM—37 strand copper—Ditto, O.D. 1.03" weight is 1648 lbs. M ft.

@.....55.07¢ per lb.

We shall guarantee the cable is of first-class material and workmanship and in lieu of other claims against it shall agree to replace: (1) any length of cable which fails under normal and proper use within one year of date of installation, and (2) any length of cable which fails within two years of date of installation which shows defects in material or workmanship, provide that in each case an immediate written notice of such failure is given to the vendor. All replacements by vendor under this guarantee shall be made free of charge F.O.B. Job Site.

We would also like to have the following information considered a part of this quotation.

1. Paragraph 2.7 lists Dow Compound #Q4205.3. We believe this to be H.M. polyethylene and not a PVC material as indicated in this paragraph.
2. In regard to paragraph 1.1A. On material that is to be supported by a messenger, etc. and where there will not be any in-Tension splices, the use of ECH-26 Aluminum has been found by many industry standards to be suitable. Where in-Tension splices might be encountered, ECH-19 Aluminum has been found to be more suitable. The ECH-26 temper offers a little more flexibility and ease of handling when installing, splicing, etc., over the ECH-19 temper.

These cables can be manufactured with either temper. For line wire, we recommend ECH-19 temper. For the Power Cable to be supported by a messenger, we feel the ECH-26 temper to be better suited from a standpoint of easier handling in the field, etc.

[fol. 5582]

3. Current Carrying Capacities—15 KV Cables

(a) 1000 MCM Alum.	—630 Amps.
(b) 700 MCM Copper	—635 "
(c) 700 MCM Alum.	—520 "
(d) 500 MCM Copper	—530 "
(e) 500 MCM Alum.	—400 "
(f) 350 MCM Copper	—425 "

4. Diameters—15 KV Power Cables

(a) 1000 MCM Alum.	—2.02"
(b) 700 MCM Copper	—1.83"
(c) 700 MCM Alum.	—1.83"
(d) 500 MCM Copper	—1.65"
(e) 500 MCM Alum.	—1.65"
(f) 350 MCM Copper	—1.46"

5. AC/DC Ratios of Cables

(a) Aluminum	1000 MCM—1.026
	700 MCM—1.013
	500 MCM—1.007
(b) Copper	700 MCM—1.034
	500 MCM—1.018
	350 MCM—1.009

6. Resistance (Ohms/1000 ft. at 25c)

(a) Aluminum	1000 MCM—.0181
	700 MCM—.0256
	500 MCM—.0356
(b) Copper	700 MCM—.0159
	500 MCM—.0220
	350 MCM—.0311

7. Breaking Strength

(a) Aluminum	1000 MCM—12,010 lbs. Min.
	700 MCM—8,408 lbs. Min.
	500 MCM—6,003 lbs. Min.
(b) Copper	700 MCM—21,340 lbs. Min.
	500 MCM—15,240 lbs. Min.
	350 MCM—11,100 lbs. Min.

[fol. 5583]

8. Coefficient of linear expansion per degrees Centigrade—Polyethylene
16-18 x 10⁻⁵

9. Current Carrying Capacity—Weatherproof Cables

(a) 1000 MCM Alum.	—780 Amps.
(b) 700 MCM Copper	—780 "
(c) 700 MCM Alum.	—600 "
(d) 500 MCM Copper	—610 "

10. Diameters—Weatherproof Cables

(a) 1000 MCM	—1.30"
700 MCM	—1.16"
500 MCM	—1.03"

11. Breaking Strength—Weatherproof Cables

(a) 1000 MCM Alum.	16,260 lbs. Min.
(b) 700 MCM Copper	31,150 lbs. Min.
(c) 700 MCM Alum.	11,620 lbs. Min.
(d) 500 MCM Copper	21,940 lbs. Min.

With regard to supervision of installations, we will do this free of charge providing that a reasonable amount of time is required.

F.O.B.—Destination

Terms—High Voltage items and Copper Line Wire items:

Invoices dated 1st to 15th, 1/2 of 1% cash discount if paid on or before the 25th, net 15th of the following month. Invoices dated 16th to the last day of month, 1/2 of 1% cash discount if paid on or before the 10th of the following month, net last day of the following month.

Aluminum Line Wire items:

Net 30 days from date of invoice.

Shipment—Start 7 weeks, complete 9 weeks after receipt of order.

15 KV Power Cable Items:

All shipments will be invoiced at the prices stated herein except for adjustment either upward or downward for the Producers price of metal on date of shipment. These prices are based on copper at 33¢ per lb.—alum. 26 1/2¢ lb. Should shipment be deferred by the customer beyond 6 months after date of order acknowledgment, shipments will then

be invoiced at the Company's price in effect on date of shipment.

[fol. 5584] Aluminum and Copper Line Wire Items:

All shipments will be invoiced at the Company's price in effect on the date of shipment.

This quotation subject to 30 day acceptance and the terms and conditions appearing on the reverse side of our letterhead are to be considered a part of this quotation.

Very truly yours, Aluminum Company of America, Rome Cable Division, C. D. Blair.

CDB:mfc

CC: (NI00) Mr. C. D. Blair, Rome Office.

[fol. 5585] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 274

October 30, 1958.

Public Service Elec. & Gas Co.,
80 Park Place
Newark 1, New Jersey

Attention: Mr. J. J. Coleman, Buyer

Gentlemen:

With reference to your letter inquiry dated October 23rd, we are pleased to quote on secondary self-supporting cable as follows:

Specification No. 84-1—Copper
Specification No. 85-1—Aluminum

Stock Code	Description	Quantity—Ft.	Price M' Net
03-1741	#4/0—3/cond. aluminum	10,000	\$ 950.00
Or			
03-1812	#2/0—3/cond. copper	10,000	\$1419.00
03-1743	397,500cm 3/cond. aluminum	10,000	\$1658.00
Or			
03-1813	#4/0—3/cond. copper	10,000	\$2016.00

Prices based on 29¢ copper
25.20¢ aluminum

Delivery: F.O.B. Destination.

Terms: 1/2 of 1% 10 days, net 30.

Shipment: Approx. 7-8 weeks lead time required.

2398

The terms and conditions appearing on the reverse side are to be considered a part of this quotation. On Copper items, prices stated herein shall be subject to adjustment to the Company's prices in effect on date of shipment. However, such prices shall not exceed any lawful ceiling prices established and in effect at the time of shipment. On aluminum items, prices and charges exclusive of applicable quantity extras shall not be increased on items shipped on or before 1/31/59 and shall not be increased more than 5% on items shipped after 1/31/59 but before 7/31/59.

Very truly yours, Rome Cable Corporation, W. S. Williams.

WSW:DSB

[fol. 5586]

July 14, 1958.

R. D. Golly—Los Angeles
G. A. Brodock—Rome
Southern California Edison

This will confirm my TWX of July 10th advising you estimating prices as follows:

Their Spec. 20-220 5 KV Ambrac, #4 copper @.....
\$348.00 M ft. #1/0 aluminum @.....\$470.00 M ft.

Very truly yours, —, —.

gab:mab

[fol. 5587] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 282

March 23, 1959.

Dixon Lewis
Pittsburgh Office
Mr. J. B. Holloman
Chicago Office

Re: Rome Cable Corporation

Attached is a copy of a letter from Mr. Dwight Thayer, Sales Manager of Rome Cable Corporation. As you know, the Rome people have been very cooperative in suggesting names of their own distributors who are interested in Alcoa conduit. We realize that it is not possible to either contact or sign up all of these distributors immediately, nor in some cases is it practical to do so. Assuring that the merger with Rome will be consummated later this week, we believe that our best interests may be served by having as many of the present Rome distributors on our team as possible. This will enable us rather quickly to offer the same package now offered by Kaiser, a combination of aluminum insulated conductors and aluminum conduit.

Please use the information in this letter for what you think it may be worth.

Dixon Lewis.

DL/rl

cc: Messrs. R. R. Burns, Chicago, D. R. Whitlow, Chicago,
W. B. Zellars, Chicago, Dean Garner, Des
Moines, W. W. Knapp, Minneapolis

Attachment

2400

[fol. 5588]

Rome Cable
Corporation
Rome, N. Y.

March 20, 1959.

Dwight Thayer
Sales Manager

Mr. Dixon Lewis,
Aluminum Company of America,
1501 Alcoa Building,
Pittsburgh, Pennsylvania

Dear Dixon:

I understand from our St. Paul office that Bill Knapp has made the necessary arrangements with H. and C. Electric, Mankato, Minn. for a consignment of aluminum conduit. I appreciate very much your cooperation in this matter and hope that your Minneapolis office found it possible to contact that list of other wire and cable distributors of ours which I gave to you.

Reports coming to me indicate that the Kaiser pressure is growing stronger as far as distributors are concerned and more and more distributors are becoming interested in aluminum conduit. It is our strong desire to call these names to your attention so that our distributors may be in position to compete with the growing trend toward aluminum conduit and in order that Alcoa may get the business rather than Kaiser.

General Electric Supply Company, Indianapolis, is a particularly good distributor as far as we are concerned and I understand from Stewart Johnston, our Chicago manager, that your local people have now agreed to take care of this house with the consignment of aluminum conduit.

There are other good wire and cable distributors of ours in our Chicago territory and here again we dislike very much to see distributors who have been doing a good job for us on wire and cable and have a consignment of wire and cable from us, ending up with a consignment of Kaiser aluminum conduit. I cannot help feel that in the long run it would be much to Alcoa's advantage to have these accounts. The names I have in mind are—General Electric

Supply Company—Fort Wayne, Indiana; Ralph David, Inc., Logansport, Indiana; Danville Electric Supply Company, Danville, Illinois; B. L. Robinson and Co., Burlington, Iowa.

[fol. 5589] I believe our Chicago man has had some contact with your Chicago people with regard to this matter but feels that he has not created much interest on their part.

It is my sincere hope that you can initiate some action toward the end of taking care of those names I have listed. Any contact with our Chicago office should be addressed to Mr. Stewart Johnston or in his absence Mr. T. C. Spriggs.

I shall appreciate very much your consideration of the above.

Sincerely, Dwight Thayer, Sales Manager.

DHT:reh

[fol. 5590] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 287

To: Los Angeles
 San Francisco
 Portland
 Seattle
 Salt Lake
 Denver
 Los Angeles—Arizona

From R. E. Gates—Torrance

Date: May 8, 1959

Subject: Aluminum Rigid Conduit

Supplementing Dwight's letter of April 29th, we are happy to report that the second increment of our initial Aluminum tubing order placed on Vernon works has been received at Torrance. The third increment which will give us a full range of sizes $\frac{1}{2}$ " through 5" inclusive is scheduled for delivery at Torrance Monday, May 11th. We believe that we will be able to start shipping against your aluminum conduit orders May 18th. Beginning on the same date, we will be able to fill your order requirements for aluminum

couplings but it appears that we are 4 to 8 weeks from fulfillment of standard 90° aluminum elbow requirements. We do not at present know the answer with regard to filling requirements for special radius aluminum elbows. You will be advised.

The prototype order quantities suggested in Dwight's letter was based on experience to date but was arrived at prior to the reduction in price initiated by Kaiser Aluminum and effective April 27th. We believe under the present price differential that you will find demand more closely parallels standard mix for steel conduit. Keeping in mind the fact that there are some prohibitions by local code authorities against the use of aluminum in some places where steel is accepted plus the fact that distributors may tend to over-order on a consignment basis, we would suggest that you discuss carefully with your distributor his initial consignment order.

The aluminum industry has adopted standard packaging for aluminum conduit and fittings which differ from our standard packaging for steel. In the interest of time we plan to ship aluminum conduit and fittings in the same standard package as you and your customers are used to for steel. In addition to the time element, we see no reason to suggest that the distributor order 50 each $\frac{1}{2}$ " and $\frac{3}{4}$ " aluminum elbows to complement 1500 feet and 2500 feet respectively of $\frac{1}{2}$ " and $\frac{3}{4}$ " aluminum conduit. I estimate the ratio of steel elbows per 10' length of steel conduit used is approximately one to 100 of $\frac{1}{2}$ " and $\frac{3}{4}$ ", seven to 100 of 1" and twelve to 100 of $1\frac{1}{4}$ " and larger. I am sure your distributors are aware of this. Due to the ease of bending of 1" aluminum and smaller, we doubt that aluminum elbow demand will equal that shown above.

You are in a unique position—you offer your distributor the only source of all his conduit needs for shipment at one time from one place. If you have any questions please advise.

R.E.G.

REG/hf

[fol. 5591] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 288

To: G. E. Rolston, Jr.—Philadelphia

From: R. E. Gates—Torrance

Date: May 8, 1959

Subject: Atlantic Refining Company—Rigid Conduit

Dear Glenn:

Many thanks for your report of Rigid Conduit tests being conducted by Atlantic Refining Company. Glenn Koger and the boys were mighty happy to learn that our product is noticeably superior. We hope that the final report will find us in the same relative position.

I gather that Aluminum proved superior to not only all other steel conduit but also ours. Since you can now sell Aluminum Conduit, you won't have to worry about us.

Many thanks, again, and we look forward with interest to your report of Atlantic's final evaluation.

Very truly yours, R.E.G.

REG/hf

[fol. 5592] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 289

cc: D. H. Thayer—Rome

P. J. Lopushinsky—Rome

May 20, 1959.

Stewart Johnston—Chicago

R. R. Davis—Kansas City

Dutton, Lainson Co.—Hastings, Nebraska

Dear Stewart:

Attached is my consignment request for them covering aluminum conductor products and aluminum rigid conduit. I have used the aluminum rigid to get their aluminum conductor business.

The figures at first glance might seem to be incongruous but I want to point out that up to this month we have only sold them cartoned bare and W/P. If you look over their

incoming orders for this month I think you will agree that the Triplex has been pretty good.

Actually when I ask Mr. Phillips to give me some sales figures for aluminum conductor he wrote and told me that in the past 90 days they have sold 13,482.22 worth of ACSR and 7,023.61 worth of drop cable. I have cut this in half.

He mentions that they also stock Triplex at North Platte and intimates that he wants a consignment there. I am going to try to stall him until we get a pattern with the Hastings house.

I am particularly glad to tie up with these people because of the way they work. They want to do a good job for every supplier so they try to hold the number of suppliers down. I think this will be a good account.

Yours very truly, —, —.

[fol. 5593] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 290

Mr. A.D.R. Fraser, Rome

Internal Correspondence

June 8, 1959.

From: Philip T. Coffin
Pittsburgh Office

To: All Conductor Salesmen
District Mgrs.—Ass't District Mgrs.
Branch Managers—Resident Managers
Chief Administrators

Re: Sales Organization for the Handling of ALCOA Aluminum and Steel Conduit

A few days ago, Mr. R. B. McKee, in a confidential letter to all District Managers and Officers of the Company, advised that preliminary steps had been taken to transfer the entire responsibility for the sale of all Alcoa aluminum conduit to Rome Cable Corporation. The following reasons for this move, we believe, will be quite obvious.

Rome Cable Corporation has had not only several years experience in the conduit field, but also many years of experience in the associated field of the insulated conductors that are so frequently carried in conduit—building wire, power and control cables, etc., Rome also has a broad distribution through probably twice the number of distributors that Alcoa has and also operates ten warehouses of its own. All of you, of course, know that conduit is sold entirely through distributors. Also bear in mind that Rome is the principal steel conduit factor in the eleven western states. Its superior quality steel conduit, EMT, and steel tubing, and very recently, aluminum conduit on a toll basis for Alcoa, are all manufactured in its plant at Torrance, California.

Mr. Dixon Lewis will be responsible for the sale of both aluminum and steel conduit and will report directly to Mr. Glenn Rolston, Vice President and Manager of Marketing, Rome Cable Corporation. Mr. Lewis will assume these duties immediately, and accordingly you may expect to hear from him promptly regarding any new policies or changes in policy he may wish to institute in connection with conduit distribution and sales.

[fol. 5594] Since Mr. Lewis has been responsible not only for the sale of aluminum conduit but also for the activities of consigned stock distributors and agents while he was attached to my office, it will, of course, become necessary to have the distributor-agency activities placed under the guidance of someone else. Until this matter has been satisfactorily resolved, Mr. Lewis will carry on in a dual capacity wherein he will coordinate Alcoa's distribution policies with those of Rome.

We realize that several of you at least have already heard something of these organization changes as well as rumors of others; we shall try to keep you posted as further developments transpire.

Philip T. Coffin.

PTC:ags

Copies: All Officers, Assistant Officers, Product Managers, Asst Product Managers, Mr. A. D. R. Fraser, Mr. G. E. Rolston, Mr. Dixon Lewis, Mr. Vaughn Chase.

[fol. 5595] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 291

ALCOA
First In Aluminum

Aluminum Company of America
1501 Alcoa Bldg., Pittsburgh 19, Pa.

News Release

For Further Information: Laurence S. Sewell, Jr.
ATlantic 1-4545, Ext. 467

For Release Tuesday, June 16, 1959, Or Anytime Thereafter

Pittsburgh, Pa., June 16, 1959—Aluminum Company of America today announced that responsibility for sales of all Alcoa aluminum conduit now is being transferred to Rome Cable Corporation, which recently became an Alcoa subsidiary.

Addition of the Alcoa line to that of the Rome, N.Y., firm will make available to the electrical industry a full line of aluminum and copper conductors and accessories and aluminum and steel conduit from a single nationally known supplier.

Dixon Lewis, Alcoa's assistant manager of electrical conductor sales since 1953, has been named product manager of conduit for Rome Cable, according to Glenn Rolston, vice president and manager of marketing for Rome. Mr. Lewis will be on Mr. Rolston's staff, but will continue to be based at Alcoa's home offices in Pittsburgh.

[fol. 5596] "The new combination of Alcoa and Rome Cable technical experience in the field of conduit and conductors, plus the joining of research, manufacturing, and sales and distribution facilities, should prove a major asset to the growing electrical industry," Mr. Rolston said.

Mr. Lewis joined Alcoa following his graduation as an electrical engineer from Cornell University in 1927. He has served the company continuously in the conductor sales field since that time, in Detroit, St. Louis, Washington, D.C., and Pittsburgh.

[fol. 5597] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 292

Internal Correspondence

June 25, 1959.

From: J. E. Perryman
Pittsburgh Office
To: District Sales Office Managers
ADRF

Re: Sales Office Information Bulletin No. 78
Sale of Aluminum Conduit By Rome Cable Corporation

The entire responsibility for the sale of all Alcoa aluminum conduit will be transferred to Rome Cable Corporation, a wholly owned subsidiary of Alcoa. Rome's past sales activity has been in the steel conduit field and the insulated conductors that are frequently carried in conduit. This product is sold through distributors and jobbers and Rome has a broader distribution through this means than Alcoa. This means, any sale of aluminum conduit will be handled through the Rome Sales Organization. Rome will establish their own distributors and jobbers as outlets for aluminum conduit; therefore, those distributors and jobbers now established as Alcoa's will either be converted to Rome Cable Distributors or the distributor agreement will be discontinued.

Aluminum conduit will be manufactured by Alcoa at two locations; Alcoa's Lafayette Works and on a toll basis at Rome's Torrance, California, Works. It is the present plan that aluminum conduit will be supplied from the stocks at these two locations. Rome's Torrance Works will supply from their stocks the eleven Western states (Washington, Oregon, California, Idaho, Nevada, Arizona, Montana, Wyoming, Utah, Colorado and New Mexico). The aluminum conduit required for the remaining states will be fabricated and supplied from Alcoa's Lafayette Works.

The sale of aluminum conduit to the eleven Western states mentioned above will only involve Alcoa's Los Angeles Sales Office. The individual sales made through the Rome Sales Organization and shipped from the Tor-

rance Plant will go directly from the Rome Sales Organization to Rome's Torrance Plant. It will be necessary to transfer the toll production of aluminum conduit from Rome's Torrance Works to Alcoa consigned stock. To accomplish this Rome will issue an "Advance Order" to cover a month's production to Alcoa's Los Angeles Sales Office who in turn will issue a consignment order for this production.

[fol. 5598] The sale of aluminum conduit for the remaining states will be shipped from our Lafayette Plant. Such sales requirements will be channeled into Alcoa's Sales Offices through Rome's Sales Offices and will be processed in the following manner:

Order entry

1. Orders for aluminum conduit will be received from Rome Cable Corporation for shipment to Rome Cable's customers. Rome Cable Sales Office will forward a copy of their Advance Sales Order (sample copy attached) to the nearest Alcoa Sales Office for entry. This sales order will have all of the information necessary to enter an Alcoa Sales Order for the aluminum conduit specified. The Alcoa sales office is to ignore the "Sold To" name shown on the sales order since all "Invoice To's" will be Rome Cable Corporation, Agent, Rome, New York. The "Ship To" address will be the same on both the Rome sales order and the Alcoa sales order. The customer's order number shown on Rome Cable's sales order is their Customer's purchase order number and this number should be shown on the Alcoa sales order form under "Customer's Purchase Order Number". It will also be necessary to show Rome Cable's Purchase Order Number, which is shown on their form as "Our Order Number", on the Alcoa sales order under "Government Contract Number". It is necessary to follow this procedure to show both Rome Cable's Customer's Purchase Order Number and Rome's Purchase Order Number to provide both purchase order numbers as references on Package Tags, Shipment Manifest, Invoices, etc.

2. Alcoa sales orders will be allotted direct to Lafayette, Indiana, for conduit and New Kensington, Pennsylvania, for couplings and elbows.

3. The Sales Order Acknowledgment copy will be mailed to the Rome Cable Sales Office originating the Rome Cable Sales Order.

[fol. 5599] 4. Since Rome Cable Corporation is acting as an agent for Alcoa for the sale of aluminum conduit, the terms and price of the order should be "Consignment".

5. It is the present plan to use a separate Bill of Lading, Shipment Manifest, Shipment Notice and Package Tags for shipments of aluminum conduit and couplings. These documents will contain a combination name of Alcoa and Rome Cable Corporation. These forms are not available at this time but will be printed and distributed to the appropriate shipping points for their use. (Until these documents are received, a rubber stamp containing the name "Rome Cable Corporation" should be prepared by Lafayette and New Kensington Works of a sufficient size to be conspicuous. This rubber stamp should be placed on the documents mentioned above in the same approximate area as the name Alcoa or Aluminum Company of America appears.) It will be necessary for the sales offices to include an acknowledgment note on the Alcoa Sales Order as follows:

"The Bill of Lading, Shipment Manifests, Shipment Notices, and Package Tags, will be supplied on special Rome-Alcoa forms."

Scheduling

Aluminum conduit is not sold directly to the ultimate user, therefore, all requirements will originate with Rome Cable's Distributors or Jobbers. The delivery of this product to the ultimate user is normally supplied from Rome's Distributor and Jobber stock, therefore, any item not in Rome Cable stock will require prompt shipment. Rome will enter sales orders for two purposes; one to supply their distributors with a stock of aluminum conduit and the other for their customer's immediate use. We are primarily concerned with those orders received requiring immediate delivery. It will be necessary for the Rome Sales Organization to clarify the urgency of those orders placed with Alcoa Sales Offices. These requirements can normally be broken into three categories: (1) Conduit re-

quired to meet a specific delivery requirement. This would [fol. 5600] normally be an immediate requirement which is not available from one of Rome Cable's Distributors or Jobbers. (2) Initial Distributor's stock. (3) Stock replacement. Rome's Sales Offices will supply this information on their sales order in the "When Required" block. When necessary Rome Cable's requirements should be expedited through Production Planning in the same manner as you would expedite any order requiring rush delivery. Other than the immediate requirement, the orders should be entered in the current schedule for this product.

Notice of Shipment

Shipment of aluminum conduit from the Lafayette Works will be included on the Daily Shipment List, the same as any other Alcoa Sales Orders. This information should be supplied to Rome's Sales Offices immediately upon receipt. If a regular Shipment Notice is required, it will be specified in the same manner as any other Alcoa Sales Order. The important thing is to keep Rome posted as to the current shipping information to enable them to service their customers.

Invoices

Rome Cable Corporation is acting as Alcoa's agent in the sale of aluminum conduit; therefore, consignment invoices will be issued to Rome Cable Corporation, Rome, New York, on each shipment from Alcoa's Lafayette and New Kensington Works. In the case of the Vernon Works, they will receive a monthly sales order from the Los Angeles Sales Office based on Rome's Torrance Works production and will issue a consignment invoice based upon the Los Angeles Sales Order. It is necessary to invoice all of the aluminum conduit to Rome Cable Corporation for the purpose of bookkeeping the consigned stock regardless of the "Ship To" address.

We are listing below Rome Cable Sales Offices that will be entering orders for aluminum conduit. These offices are listed in two categories: (1) Those offices supplying the [fol. 5601] eastern states and (2) those offices supplying the eleven western states.

Offices Supplying the Eastern States

New England—"NE"

A. D. Stein, Inc.

80 Federal Street

Boston 10, Massachusetts

Tel: Hancock 6-7272

New York State—"NYS"

Rome Cable Corporation

330 Ridge Street

Rome, New York

Tel: Rome 3000

Pittsburgh—"Pitts"

Rome Cable Corporation

414 Oliver Building

Pittsburgh 22, Pennsylvania

Tel: Atlantic 1-0816

Chicago—"Chg"

Rome Cable Corporation

4505 West Grand Avenue

Chicago 39, Illinois

Tel: Spaulding 2-2700

Minnesota—"St. Paul"

Rome Cable Corporation

345 N. Wheeler Avenue

St. Paul 4, Minnesota

Tel: Midway 6-7201

Southern (Sub)—"So-Ga"

Rome Cable Corporation

156 Simpson Street, N. W.

Atlanta 13, Georgia

Tel: Murray 8-9860

New York Metropolitan—"NY"

Rome Cable Corporation

60 East 42nd Street

New York 17, New York

Tel: Murray Hill 2-6590

Philadelphia—"Phila"
 Rome Cable Corporation
 12 South Twelfth Street
 Philadelphia 7, Pennsylvania
 Tel: Market 7-2070

Ohio—"Ohio"
 Rome Cable Corporation
 729 Society National Bank Building
 145 Public Square
 Cleveland 14, Ohio
 Tel: Superior 1-1240

Chicago (Sub)—"C-St.L."
 Rome Cable Corporation
 6617 Clayton Road
 St. Louis 17, Missouri
 Tel: Volunteer 3-4944

Detroit—"Det"
 Rome Cable Corporation
 521 New Center Building
 Detroit 2, Michigan
 Tel: Trinity 2-7578

[fol. 5602] Offices Supplying the Eleven Western States

Chicago (Sub)—"C-RM"
 E. T. Vonier, Inc.
 1160 Elati Street
 Denver 4, Colorado
 Tel: Keystone 4-0533

Central Pacific District—"PAC-SF"
 Rome Cable Corporation
 1100 Selby Street
 San Francisco 24, California
 Tel: Valencia 6-3580

Central Pacific (Sub)—"PAC-SF-U"
 Rome Cable Corporation
 230 South Fourth, West
 Salt Lake City 1, Utah
 Tel: Elgin 9-8811

South Pacific District—"PAC-LA"**Rome Cable Corporation****P. O. Box 6720****2510 South Malt Avenue****Los Angeles 22, California****Tel: Raymond 3-3631****North Pacific District—"PAC-SEA"****Rome Cable Corporation****3430 Fourth Avenue, South****Seattle 4, Washington****Tel: Main 4-3017****J. E. Perryman.****JEP/mat**

Copies to: Asst. District Sales Office Managers, Branch Sales Office Managers, Resident Sales Office Managers, Product Managers and Assistants, Industry Managers, All Administrators, Credit Representatives, Electrical Conductor Salesmen. Messrs. M. M. Anderson, L. E. Hickman, R. V. Davies, R. B. McKee, L. P. Favorite, F. J. Close, G. B. D. Peterson, S. T. Gustina, J. V. Kohler, W. K. Unverzagt, G. O. Sterling, H. L. Hall, J. T. McCullough, Dixon Lewis, Glenn Rolston, Rome Cable Corporation, Rome, New York, J. P. Lamoureux, Lafayette Works, F. A. Fickes, Jr., Lafayette Works, J. P. Freeman, Lafayette Works, J. R. Bell, New Kensington Works, R. G. Loughran, New Kensington Works, Leon Veitch, New Kensington Works, A. H. Luther, Cressona Works, L. R. Overly, Cressona Works, P. D. Bosworth, Cressona Works, H. R. Dodge, Vernon Works, M. K. Stabe, Vernon Works, A. E. Grandey, Vernon Works.

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[Vol. 5063]

KONE CABLE CORPORATION

ROME, NEW YORK

DATE OF ORDER

1000/1000

ORDER NO.	73000	DATE	6/9/59	TO	CHICAGO	DATE	5/1-2/0	TO	CHICAGO
FROM	THE A B C COMPANY 11 STATE STREET CHICAGO, ILLINOIS.				THE A B C COMPANY 11 STATE STREET CHICAGO, ILLINOIS.				

RUSH ALL POSSIBLE.

QUANTITY ORDERED	1.	5,000 FT.	1/2" RIGID ALUMINUM CONDUIT	963-05-00-008	455	DEST.
QUANTITY ORDERED	2.	1,000 FT.	1/4" RIGID ALUMINUM CONDUIT	963-07-50-009		

THIS IS A SAMPLE ORDER
DO NOT ENTER

CONSIGNMENT ORDER

ALCOA OFFICE

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[Vol. 5604] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 308
ROME CABLE
 CORPORATION

ROME, N.Y.

REPORT SUBMITTED TO THE BOARD OF DIRECTORS
 OF ROME CABLE CORPORATION AT THEIR MEETING
 DECEMBER 10, 1958

IN WITNESS
 WHEREOF THE BOARD

I give below record of Sales and Earnings by fiscal years through March 31, 1958.
 and by quarters for the current year, the month of October and estimates for November.

Fiscal Year Ended	Net Sales	Earnings
March 31, 1937	\$ 1,798,092	\$ 1,616
March 31, 1938	4,957,103	71,027
March 31, 1939	5,370,665	245,036
March 31, 1940	6,080,902	297,736
March 31, 1941	9,465,451	431,501
March 31, 1942	11,631,785	592,135
March 31, 1943	12,712,333	367,654
March 31, 1944	16,909,735	466,709
March 31, 1945	22,798,218	486,653
March 31, 1946	16,975,009	398,973
March 31, 1947	18,436,305	1,359,593
March 31, 1948	25,202,853	1,152,579
March 31, 1949	26,088,523	1,115,960
March 31, 1950	19,602,984	302,209)
		Plus: Transfer from contingency reserve 150,000)
March 31, 1951	35,142,901 Net	\$1,922,136
	Minus Transfer to Copper Reserve	150,000
March 31, 1952	52,657,848	1,772,136
March 31, 1953	54,632,976	1,753,651
March 31, 1954	44,114,825	2,008,321
March 31, 1955	39,186,095	1,637,787
March 31, 1956	56,996,682	930,879
March 31, 1957	52,790,055	2,023,070
March 31, 1958	40,614,730	2,255,819
April-June Quarter	8,490,983	1,019,071
July -- Sept. Quarter	9,522,551	(10,868)
Total Six Months	18,013,534	122,704
October 1958	3,580,000	111,836
November " (Est.)	3,104,000	63,000
December " (Est.)	3,291,000	42,000
Total Third Quar. (Est.)	9,975,000	38,000
Total Nine Mos (Est.)	\$ 27,988,534	143,000
		\$ 254,836

[Feb. 5605]

ROME CABLE CORPORATION

Earnings for the second fiscal quarter were better than the estimate at our September meeting. Estimates for the current quarter indicate a 5 per cent increase in sales and projected earnings of \$143,000, or 25 cents a share.

SALES AND ORDERS

The breakdown of sales comparison of the first eight months of 1958 with the same period in 1957 by product class is listed below:

	April-November* 1958	April-November 1957	% Increase or (Decrease)
Rods	\$ 3,210,000	\$ 3,842,000	(16.5)
Bare	3,230,000	3,373,000	(4.2)
Weatherproof	755,000	1,073,000	(29.6)
Magnet	960,000	1,507,000	(36.3)
Rubber Covered.	9,815,000	11,959,000	(17.9)
Aluminum	2,090,000	2,590,000	(19.3)
ROME PLANT TOTAL	\$20,060,000	\$ 24,344,000	(17.6)
Torrance-EMT & Industube	\$ 2,540,000	\$ 2,220,000	14.4
Rigid	2,520,000	3,223,000	(21.8)
TORRANCE TOTAL	\$ 5,060,000	\$ 5,443,000	(7.0)
COPE	\$ 1,020,000	\$ 1,463,000	(30.3)
TOTAL SALES	\$26,140,000	\$ 31,250,000	(16.4)

* Preliminary

October sales were the highest since August a year ago. Unfortunately, the steady improvement in billing volume which continued through October, reversed in November and volume dropped back about 14 per cent below October, the poorest month since July. Incoming orders had shown steady increase for every month since last December but in mid-November noticeable declines appeared bringing total incoming back to March-April-May levels. December should show some improvement. The rapid rise and fall in the world copper market and year-end dressing up of balance sheets may have had some effect in this most recent reaction. We know it has also affected other companies in our industry.

[Vol. 5606]

ROME CABLE CORPORATION

BACKLOG OF ORDERS

		Value
December 31, 1957	Rome -Copper Products	\$ 1,895,000
	Aluminum	257,000
	Torrance-EMT & Industube	132,000
	Rigid	78,000
		<u>\$ 2,362,000</u>
June 30, 1958	Rome -Copper Products	\$ 1,575,000
	Aluminum	295,000
	Torrance -EMT & Industube	171,000
	Rigid	88,000
		<u>\$ 2,129,000</u>
November 22, 1958	Rome -Copper Products	\$ 1,988,000
	Aluminum	222,000
	Torrance -EMT & Industube	139,000
	Rigid	99,000
		<u>\$ 2,448,000</u>

From the above you can see that most ordering is still on a near-term basis.

RAW MATERIALS.

Copper supply tightened in October and early November due to strikes and on October 23rd the price increased to 29 cents. World price went above 30 cents. World statistics for October showed a large drop in available stocks. In the last few days, however, custom smelter price dropped to 28-1/2 cents reflecting drying up of buying and settlement of strikes.

Aluminum and steel have been in ample supply. Rumors continued to circulate on a possible aluminum price increase early in January, estimated to be 1.3 cents per pound, which would restore the two cent drop initiated by Aluminium, Ltd. last summer. Since writing the above some aluminum producers have announced price protection for six months until July 1, 1959 which belies any such rumor.

PAYROLL STATISTICS

ROME	Week Ending	No. Employees	Total Payroll	Avg. Wkly. Wage	Avg. Hrs. Per Wk.	No. Salaried Emp.
	11/24/57	M 781 F 30 <u>811</u>	\$ 75,527	\$ 93.13	40.2	458
	6/8/58	M 620 F 21 <u>641</u>	\$ 61,967	\$ 96.97	40.9	426
	11/23/58	M 712 F 29 <u>741</u>	\$ 75,760	\$ 102.24	42.5	430

[fol. 5607]

ROME CABLE CORPORATION

PAYROLL STATISTICS - Cont'd.

<u>TORRANCE</u>	<u>Week Ending</u>	<u>No. Employees</u>	<u>Total Payroll</u>	<u>Avg. Wkly. Wage</u>	<u>Avg. Hrs. Per Wk.</u>	<u>No. Salaried Emp.</u>
	11/24/57	124	\$ 12,317	\$ 102.21	39.9	55
	5/25/58	125	13,465	107.22	39.8	56
	11/16/58	136	16,237	120.71	41.9	56
<u>COPE</u>	11/23/57	56	\$ 3,864	\$ 68.99	38.2	34
	5/24/58	51	3,592	70.43	38.7	32
	11/22/58	45	3,247	72.15	38.7	30

Rome employment in late November is at the best level since about the same time a year ago but some shorter shifts will be necessary in December. Total number of salaried workers is down more than 10% from peak levels. In accordance with contract provisions Torrance hourly employees were granted a 7 cents per hour increase in October. Rome increase of 7 cents per hour becomes effective December 15. Salary increases of \$13 per month were also made for both plants.

On October 1st we restored the salary cuts for all employees above \$750 per month. The 5 per cent cut on those below \$750 per month had been restored on August 1st. This total salary reduction saved almost \$40,000 while in effect.

PRICES

In the early part of our fiscal year prices on many construction wires were at or near the lowest level since before World War II, and have remained at lower levels for a more extended period than has been true in the same past period. The latest sheet of early November does recognize increased copper cost from the 25 cent low and a certain amount of price improvement on some competitive sizes, but still are far from satisfactory levels. Thirty per cent of the volume in October of these items were at the April price level with additional discounts. We still have some half million dollars of building wire jobs to be shipped in the balance of the fiscal year at these ruinous prices.

Because of competitive bidding on some Government jobs wherein two small competitors were shown to drop the price below published sheets, one of the producers cut bare and ACSR 1.3 cents per pound and insulated products another 10 per cent. This action alone will cost us an estimated \$40,000 for the balance of the year. The practices of producers in slashing prices on fabricated products and taking their profit from volume of prime products is extremely vicious.

[Vol. 5008]

ROME CABLE CORPORATION**ROME**

There has been a steady improvement in volume at the Rome plant but for the first seven months of the fiscal year billings are almost 18 per cent behind a year ago. A portion of this is lower copper prices but a very sizable amount is lower selling prices. Prices on many construction wires in the first quarter of our fiscal year were as much as 40 per cent below that of a year ago. If October sales had been billed at current construction wire prices, results would have grossed \$61,000 more.

Our enamelling equipment for rectangular magnet wire got into production in August and is getting excellent reception from our customers. The rapid growth of acceptance of this product is changing from glass and other types indicates the pressing need for one additional machine.

TORRANCE

Volume at Torrance has held up better than at either of the two other plants. Production of up to 4" conduit will get under way this month but will not be much of a factor in the current fiscal year. We have an agreement with Kraloy Company in Los Angeles to sell plastic conduit on a satisfactory basis. We are negotiating for finishing the production and sale of aluminum conduit with another Company in the Los Angeles area providing the pipe.

COPE DIVISION

Volume at Collegeville is down more than either of the two other plants. This has been due to additional manufacturers getting into the field and very low prices on sizable jobs. We are introducing a new product which is called "Controlway" without any elaborate tooling, which is estimated to add about 20 per cent to our trough sales next year. They have been working on an interesting Bus Box product which will probably take several months to perfect, design and tool. This has been developed by our Cope people working with our Engineering and Laboratory sections in Rome, and we have high hopes for its possibilities.

RESEARCH & ENGINEERING

We have actually introduced our new Spacer and have a small installation with Commonwealth Edison in Chicago. Great interest is being expressed in this product by utilities because of its lower net cost of installation, and also by many other companies in the industry. We have applied for a patent on this. We are currently working on a very sizable inquiry for Public Service & Gas of New Jersey.

More interest is being expressed also in our flame resistant polyethylene. This may have commercial possibilities of it being combined with the Spacer in high voltage cable.

[fol. 5009]

ROME CABLE CORPORATION**CAPITAL EXPENDITURES**

Through October 31 we have expended approximately \$800,000 of the \$1,100,000 of capital expenditures approved for 1958. Of the total approvals \$750,000 represented carryovers from 1957. On the unexpended balance approximately \$30,000 will be carried over to 1959 fiscal year. Breakdown of the \$1,100,000 is roughly - Rome \$575,000, Torrance \$500,000 and Cope \$25,000. We have preliminary requests for 1959 exceeding one million dollars. In view of the current earning results I recommend total informal approval of \$250,000. \$140,000 Rome, \$100,000 Torrance and \$10,000 Cope. We need another enamel oven in Rome at an estimated cost of \$80,000, and Torrance should decide on type of high frequency welding head and power supply to enable us to make aluminum tube. The cost of this unit is estimated at \$65,000.

DIVIDEND

Consideration should be given at this meeting on payment of Common Stock Dividend payable in January.

PROFIT-SHARING AND EMPLOYEE DIVIDEND

In view of low earnings I recommend that we continue to make no payment to the Profit-Sharing Trust or Employee Dividend.

The Profit-Sharing Trust with J. P. Morgan & Co. Incorporated as Trustee had a book value of \$164,986, and a market value of \$191,700 as of December 1, 1958 and shows over 16 per cent appreciation. Estimated return was \$7,188 or 4.40 per cent on book value.

ROME CABLE FOUNDATION, INC.

While it has been customary to take action on contribution to the Rome Cable Foundation, Inc. at this meeting we recommend no action at this time.

ORGANIZATION CHANGES

We are very happy that our friend of long standing, Mr. Albert D. Berning, former resident partner of Ernst & Ernst and now consultant for his firm, has agreed to work with us also as a consultant. His broad background and experience in industry generally, and his knowledge of our organization and problems should prove most helpful to us.

The position of Advertising Manager, which was open after the resignation of Paul Nelson, was filled by the appointment of Albert Dudreck his assistant. Doubts as to his being able to take over full charge were definitely removed by

[fol. 5610]

ROME CABLE CORPORATION

ORGANIZATION CHANGES - Cont'd

the fine manner in which he handled the department in the several months after Mr. Nelson's resignation.

GENERAL

I hope that the major portion of the meeting will be consumed in certain discussions on "Whither Goest Thou?" for the Company.

Respectfully submitted,

H. T. Dyett,
Chairman of the Board

[fol. 5611] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 315

Rome Cable Corporation
Torrance Sales Conference

March 21 and 22, 1952

[fol. 5612] Rome Cable Corporation
1952 Torrance Sales Conference

Outside Sales Personnel

1. H. S. Warren—Los Angeles, Calif.
2. O. O. Stedman—Los Angeles, Calif.
3. E. W. Bray—Los Angeles, Calif.
4. R. E. Gates—Los Angeles, Calif.
5. C. H. Kaufman—San Francisco, Calif.
6. G. F. Black—San Francisco, Calif.
7. H. L. Rawlings—Salt Lake City, Utah
8. K. B. Arnett—Seattle, Wash.
9. A. M. Mitrovich—Portland, Ore.
10. A. D. Peabody—Dallas, Tex.
11. Stewart Johnston—Chicago, Ill.
12. T. H. Stokke—St. Paul, Minn.
13. E. T. Vonier—Denver, Colo.

Rome and Torrance Personnel

14. A. D. R. Fraser—Rome, N. Y.
15. G. E. Rolston—Rome, N. Y.
16. R. A. Schatzel—Rome, N. Y.
17. O. I. Lewis—Rome, N. Y.
18. D. H. Thayer—Rome, N. Y.
19. A. A. Andersen—Torrance, Calif.
20. Gilbert Woodill—Torrance, Calif.
21. C. H. Samson—Torrance, Calif.
22. J. E. Hoberecht—Torrance, Calif.
23. F. B. Francis—Torrance, Calif.
24. F. N. Taxon—Torrance, Calif.
25. S. V. Bonanomi—Torrance, Calif.
26. Jerry Moran—Torrance, Calif.

[fol. 5613]

**Rome Cable Corporation
Torrance Sales Conference
March 21 and 22, 1952**

General Program

Friday—March 21

- 8:00 A.M.—Leave Chapman-Park Hotel for Torrance plant
- 9:00 A.M.—Opening remarks
- 9:30 A.M.-12:00 N.—Plant visit
- 12:00 N.-1:15 P.M.—Luncheon at Chapman Park Hotel
- 1:15 P.M.-5:30 P.M.—Conduit sales session
- 6:30 P.M.—Dinner—Chapman-Park Hotel

Saturday—March 22

- 9:00 A.M.-12:00 N.—Wire and cable sales session
- 12:00 N.-1:15 P.M.—Luncheon Chapman-Park Hotel
- 1:15 P.M.-4:00 P.M.—Wire and cable sales session
- 4:00 P.M.—Adjournment

Agenda

Rome-EMT

- Report by District Managers on order backlogs, current demand, future outlook and competitor activities.
- Effect of industry split on price levels.
- Need for continuation of rationing.
- Prevalence of ratings, military and other.
- Suggestions for stimulation of sales.
- Present status TV mast business.
- General construction picture—1950 vs. 1951 vs. 1952.
- New size mix.
- Zinc situation—allotments, etc.
- Consigned stocks—necessity for.
- Sales statistics—GESCO and WESCO.
- [fol. 5614] Suggestions for improvement Torrance Sales Service.
- Need for information competitor prices, quality, services and policies.

Suggestions as to literature both EMT and Rigid.
 Caution re military specs.—Export packing, etc.
 Comparison of sales by Districts—1950 vs. 1951.
 Other items of topical interest.

Rome-RIGID

Discussion of Sendzimir process by R. A. Schatzel.
 Desirability of sample kit and discussion of its contents.
 Discussion of order backlog and mill condition.
 Production increase forecast—G. Woodill—Status new heavy mill.
 Military demand various districts—outstanding jobs obtained.
 Discussion of competitive price situation various districts—possible need for limited freight absorption.
 Necessity for 2½ to 4" sizes.
 Demand, if any, (other than military) for black enameled and statement of our policy with respect to manufacture.
 Attitude of N.P.A. toward ratings in Conduit Industry and their effect in getting steel allotments.
 N.P.A. attitude toward jobber stocks.
 Status of price levels and O.P.S.
 Attitude of N.P.A. in matter of essentiality of steel electrical raceways.
 Advertising plans rigid.
 Other items of interest.

[fol. 5615]

Rome Cable Corporation
Torrance Sales Conference
March 21 and 22, 1952

Friday Morning Session—March 21, 1952

Torrance Plant Visit

Upon arrival at the Torrance plant the group assembled for brief opening remarks by Messrs. G. E. Rolston and Gilbert Woodill.

Assignment of individuals to plant guides was made and the rest of the morning was spent in inspecting the Torrance plant facilities.

Friday Afternoon Session—March 21, 1952

General Sales Discussion—G. E. Rolston

In the way of introductory remarks Mr. Rolston expressed to the Torrance plant personnel the frank exchange of opinions characteristics of Rome Cable sales conferences and invited their participation in discussion.

Rome-RIGID

Mr. Rolston described the customer interest he had found on his trip down the West Coast in our production of rigid steel conduit and outlined briefly production problems encountered by the plant. In view of our present rigid conduit backlog and the need for prompt delivery, Mr. Rolston asked Mr. A.D.R. Fraser for a resume of the plant's production picture.

Mr. Fraser first stressed to the group the desirability of treating production data as confidential and went on to explain that a thorough study of the rigid conduit situation had been made at the plant and expressed the opinion that delivery of hot dip galvanized rigid conduit was some 60 days away, although alleviation of the situation had been found in the possibility of electrogalvanizing. It was estimated that with permission to electrogalvanize, shipment of $\frac{3}{4}$ " could be effected within a week or ten days and 1" and $\frac{1}{2}$ " shortly thereafter. In the interest of customer

service the company will absorb freight differences where small shipments are considered necessary to satisfy the customer.

In the meanwhile progress is being made daily on the new hot dip galvanizing unit, the difficulties experienced being nothing more than those attending any new equipment project. Hope was expressed that the plant would be able to start shipping some hot dip galvanized rigid conduit before the end of April.

In the meantime, sales personnel were urged to get specifications changed from hot dip to electrogalvanizing wherever possible.

Mr. R. A. Schatzel presented explanation and discussion of the Sendzimir process of hot dip galvanizing steel pipe. In complimenting the Torrance plant personnel on the production job done to date, Mr. Schatzel outlined some known competitive practices in the manufacture of rigid conduit, all of which brought out the anticipated superiority and [fol. 5616] uniformity of Rome-RIGID quality. In explaining the Sendzimir process it was noted that uniformity and quality of zinc coating are all-important to the quality and workability of the finished product. Timing in the process of galvanizing is essential and comparison was drawn between Torrance's automatic operation and the haphazard methods of competition. It was pointed out by Mr. Schatzel that Rome Cable would be the first to use the Sendzimir process in the galvanizing of pipe and mentioned the success of Armco in applying the process to sheet steel over a period of some fourteen years.

Mr. A. A. Andersen supplemented the above remarks by pointing out that Rome Cable would be the first to manufacture rigid conduit by cold forming and electrowelding. He also laid stress on the merits of Torrance's shot-blasting process in that it avoids conventional pickling of the steel and has the effect of toughening the surface of the steel, therefore, enhancing ductility of the finished pipe.

Mr. Rolston urged sales personnel to be alert to city, county, or state regulations requiring submission of samples for approval. We should make an effort to get on as many approved lists as possible and have found ourselves ignorant of the sample submission requirement in instances in the past.

Mr. Rolston raised a question concerning the desirability or necessity of selling kits in the promotion of Rome-RIGID. Consensus of opinion indicated that a selling kit was desirable as a sales tool for our own personnel, as well as jobbers' salesmen in promoting Rome-RIGID business. Mr. D. H. Thayer solicited comment as to the nature and contents of such a sales kit and response indicated that it should not be too heavy and that it should contain samples of both Rome-RIGID and Rome-EMT, including test pieces as it was felt that the abuse these pieces show is one of our strongest selling points. It was felt also that the sales kit should include product literature pertaining to Rome-EMT and Rome-RIGID. Mr. Thayer will attempt to develop these suggestions into some more definite shape for further consideration.

Mr. O. I. Lewis outlined the general order backlog and mill condition on Rome-RIGID.

While as of March 21 we had on our books orders for 5,093,000' of Rome-RIGID, this only represented some 3,500 tons of pipe against an anticipated output of 1,800 tons per month.

Mr. Lewis presented statistics which indicated our profitable market for Rome-RIGID as being confined to seven western states. Figures further indicated that these seven states represent about 15% of the national sales potentiality. Further comparison indicated that to sell our expected plant capacity for Rome-RIGID we would need 41% of the potential total sales in the seven states to be served from Torrance. It was agreed that this picture called for the utmost in sales effort.

Mr. Rolston stressed the desirability of acquaintance with military and governmental purchasing offices at all levels, as well as complete knowledge of governmental specification details. We should be alert to unusual packaging requirements or "catch" clauses which might increase our costs. Mr. Lewis reviewed current military orders on our books and indicated going price levels. Mr. Rolston defined this military business as looking attractive and Mr. Fraser urged a continuing flow of competitive and trade information to Rome.

In discussing the competitive price situation Mr. Lewis presented a map which, based on comparative freight rates,

indicated our profitable Rome-RIGID market to be pretty much confined to the seven western states. Our F.O.B. Torrance price sheet shows a price disadvantage of some \$.50 to \$1.00 per cwt. in the Mountain states. The Plains states, including a greater part of Texas, plus southeastern U.S., show a price disadvantage in excess of \$1.00 per cwt. These figures would seem to pretty well define our Rome-RIGID market and eliminate the possibility of stocking and selling it out of our present Dallas, St. Paul and Chicago warehouses.

In concluding discussion of rigid conduit, Mr. Rolston asked for opinions regarding the necessity of Rome-RIGID in sizes bigger than 2". Opinions expressed indicated the need for conduit sizes up to 4", it being felt that lack of the complete range would in some instances cause us loss of business. There seemed to be no unanimity in opinion as to the demand for these heavier sizes percentage-wise. Those present were urged to try to get some figures indicative of this demand so that the seriousness of the problem might be better evaluated. Mr. Rolston advised the group that this matter would receive consideration as long as it was considered to be a sales obstacle.

Rome-EMT

Primary discussion evolved around the decided falling off of customer demand for electrical metallic tubing. Plant stocks have increased rapidly and the product is backing up in our warehouses, as well as wholesalers' inventories. There has been some evidence of price cutting.

Mr. Rolston related his visits with customers down the entire length of the Pacific Coast in which he found evidence of a slackening demand and posed the question for group discussion. In the roll call discussion which followed, reasons for the falling market were expressed as:

- Shortage of copper wire to go in the conduit
- Dumping of inventories from one territory to another
- N.P.A. denial of building approvals
- The unusually severe weather of western states

Regarding the outlook for the future, the consensus of opinion indicated an expected pick up in Rome-EMT business after a lull of possibly 60 to 90 days.

In discussing ways and means of stimulating Rome-EMT sales, opinion was expressed that TV mast business could have been improved if all sizes of EMT had been available. Opinion was expressed that the lack of 1½" had hurt this [fol. 5618] business in the Los Angeles area.

Mr. Woodill explained the unbalanced size availability as going back to the basic purchasing of steel. The correct gauge and width of steel has often times been unavailable and plant production has by necessity been predicated upon delivery of steel sheet and, therefore, often unbalanced as to size. However, this situation is improving, and Mr. Woodill expected to be able to level out size discrepancies. Mr. Rolston pointed out that under today's competitive situation we must be more flexible as to conduit size.

Mr. Rolston pointed out our apparent misjudgment of the Rome-EMT elbow situation. Opinions as to what might be done to improve our sales varied but it was unanimously felt that both Rome-EMT and Rome-RIGID elbows were a necessary part of our line.

Mr. Rolston raised the question of the real need for black enameled rigid conduit. There seems to be very little need for it, based on the opinion that customers will take it only when they can get nothing else.

Priority Ratings

As they pertain to Rome-EMT and Rome-RIGID, Mr. Lewis expressed the opinion that priority ratings other than A through E now have little significance, except that in accordance with the basic priority setup a rated order does supersede an unrated order, production-wise. NPA's attitude toward jobber's stocks seems to be that they are necessary and proper. Mr. Lewis made reference to the Conduit Industry Committee's recent article on the essentiality of steel electrical raceways as part of a program to impress upon NPA the necessity of material allotment for conduit manufacture.

We have reprints of this article available and customer distribution of them was urged.

Consigned Stocks

In the discussion of this subject recognition was given to the necessity of consigning Rome-EMT in order to maintain

a competitive position. Requirement figures were collected from those sales districts involved for the purpose of seeking executive approval for the granting of consignments. Sales managers will be advised of authorizations as approved.

Until the availability of Rome-RIGID improves no authorization for consignment of this product will be granted.

Advertising

Mr. Thayer outlined briefly advertising plans as they pertained to both Rome-RIGID and Rome-EMT. The program has been given impetus by the taking of additional space (fol. 5619) in Electrical West and the immediate plan is to place emphasis on Rome-RIGID, thereafter combining or alternating the two conduit types.

The need of product literature was acknowledged and work will be started on the catalog section covering both Rome-RIGID and Rome-EMT.

Attention was called to the availability of Electrical Steel Raceways for customer distribution.

Question was raised regarding the effectiveness of direct mail effort and the general feeling seemed to be that it should be a part of our promotional effort.

Saturday Morning Session—March 22, 1952

General Sales Discussion—G. E. Rolston

Rome-EMT

As unfinished business, discussion took place regarding the market for Rome-EMT as TV masts. Opinions expressed brought out a number of differences in customer requirements depending upon geographical location, etc.

The market was recognized as one worth developing and Mr. Rolston urged that we attempt closer contact with the actual manufacturer of the masts, particularly where the business went through an electrical wholesaler. In other words, the business being non-electrical, we probably can save ourselves much grief by closer contact with the end use.

Commercial Tubing

This market was pointed out as being a sales possibility to which we should always be alert. Our Torrance facilities are suitable and it might well prove a production lifesaver in a time of slow electrical demand.

We cannot handle special alloys or stainless steel, but would like to receive all possible information on worthwhile business involving carbon steel tube.

Wire and Cable

The balance of Saturday's discussion was thrown open to Rome products without any formal agenda.

The first order of discussion, because of its present interest, pertained to aluminum conductors.

Mr. Rolston stated that on his trip down the coast he had seen considerable evidence of government pressure to substitute aluminum for copper. He quoted national statistics indicating the increased use of aluminum as an electrical conductor over a period of years.

[fol. 5620] Considerable confusion exists in government allocation of aluminum. Mr. Fraser reviewed some of the allocation problems as they have effected our own use of aluminum. Opinion was expressed that there would be more aluminum available for insulated conductors in the last half of 1952. Present availability, however, is tight and we have taken some orders in the hope of getting the necessary aluminum conductor. We may fall down on some of these and be subject to customer criticism due to circumstances out of our control.

Mr. Schatzel led a discussion of some of the uses of aluminum conductor. He related recent meetings of IPCEA and AIEE, both held in the attempt to find answers to some of the electrical problems, as well as to establish industry standards.

One big question remains to be the method of connections. As far as building wires are concerned there is no manufacturing problem, but rather a problem of our responsibility. There is still no satisfactory and proven method of connection. The compression type seems best, so far.

Mr. Schatzel stated that we feel aluminum conductors have a safe and permanent place in our picture; namely,

overhead as service drop or line wire and possible in building wires 1 AWG and larger where installation will be in the hands of trained personnel.

Industry efforts towards standardization currently involve establishment of standards for self-supporting service drop cable and the matching of conductor sizes of copper vs. aluminum, based on current carrying capacities.

Mr. Fraser referred to the recent agreement between Alcoa and Rome Cable. It is considered by us as an important "two-way street" in that we can get the benefit of their experience with aluminum conductors in exchange for our insulating knowledge. Mr. Rolston stated his expectation that the arrangement would lead to friendly competition of a high order. Sales personnel should make it a point to get acquainted with local Alcoa personnel. Difficulties will arise, a typical one being, inasmuch as aluminum is an allocated material, the possibility of Alcoa and ourselves quoting different delivery on the same job due to the fact that our allocation for a certain quarter may be all sold, whereas, they may have open availability. These situations will arise and will have to be worked out as they come up.

Mr. Rolston presented the aluminum price picture as being complicated due to the many variations and constructions. We are doing our best to get price sheets out in the field as quickly as possible. We will not issue a price sheet showing building wire smaller than 6 AWG and we prefer sizes 1 AWG and larger.

Mr. Schatzel explained the rather complicated number system used by Alcoa to indicate aluminum tempers. The Engineering Department will get out an information letter on this subject.

[fol. 5621] Moving from aluminum to copper discussion revolved around the pricing of power and control cables of the all rubber type, principally RoZone-RoPrene. Current pricing regulations for this type of cable cover a multitude of sizes and types. A real problem is involved in arriving at realistic prices. We have never been properly compensated for short runs. We have been following price regulations in this respect, with the result that some prices quoted have appeared out of line. We must, however, give these new short run charges a try until we find we cannot live with them and still be competitive.

Mr. Fraser expressed Rome Cable's determination to be competitive where competition is realistic.

Mr. Schatzel asked for competitive samples of rubber and Neoprene high voltage power cables (5 KV) from the field. Our costs on RoZone-RoPrene have been high. Competitive samples will indicate what our competitors are doing and may assist us in cost reductions. We recognize only Okonite and Kerite as being competitive to RoZone from the standpoint of quality. We do not want to lessen the quality of RoZone, but we must cut manufacturing costs.

Mr. Schatzel introduced the discussion of butyl vs. oil base compound and recognized the West Coast as being one place where competition has talked down oil base compounds in favor of butyl. While we may find ourselves coming to the wider use of butyl compound, we should in talking with customers make sure that comparisons between oil base and butyl are based on recognized industry tests . . . not trick ones. Oil base will still stand up favorably in comparison except, of course, for butyl's resistance to high temperatures.

Saturday Afternoon Session—March 22, 1952

General Sales Discussion—G. E. Rolston

This concluding session of the conference was devoted to analysis and review of the company's present overall order backlog. In other words, how realistic can we consider it?

The firmness of our backlog can materially effect both our short and long range picture from the standpoint of inventory, profitable production and serviceability to our customers. If there is copper now allocated in our backlog against worthless orders, we should determine that fact now and divert the copper to badly needed products, rather than waiting for cancellation and finding such diversion impossible. Discussion, therefore, was aimed at trying to find out "where we stand."

Comments and opinions were solicited from each sales district represented and while various explanations were made for apparent "soft" spots, the general consensus of


opinion seemed to be that the demand as reflected by our current backlog is real in most cases.

Mr. Fraser stated that responses to his recent questionnaire indicated our backlog to be 80 to 90% firm. [fol. 5622] However, he urged that we examine closely our X-6 orders to be sure that we have the type of orders on our books that really mean something. Our large investment in outstanding reels was quoted by him as indicative of what we feel must be pyramiding inventories in the hands of customers.

The discussion was concluded with strong admonition by Mr. Rolston that we keep our ear to the ground with respect to our present backlog. We must be alert to any change or trend we see developing that may effect our backlog situation. Mr. Rolston recommended and requested that each salesman present set up his own personal system of keeping tabs on pushbacks and cancellations so that he may quickly sense any softening of the national market.

A plea was made by Messrs. Fraser and Rolston for continued competitive information of any kind. We have no desire to establish formal sales call records but Rome must be kept better informed of competition. The possible desirability of a simple multilith form for reporting competitive information was expressed and those present were urged not to withhold news of competitive practices just because they thought or assumed someone else would report the same information.

The afternoon session was concluded by adjournment at 4:00 P.M.



[fol. 5623] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 334

cc: D. H. Thayer, A. D. R. Fraser
To: G. E. Rolston
From: J. R. Woods
Date: May 5, 1959
Subject: Aluminum Sales Policies

Dear Glenn:

Ross asked me to outline some of the problems we have had or anticipate in the Alcoa affiliation. Naturally, my first desire is for a definite sales policy which will integrate the sales forces and take advantage of our combined efforts. I hope we can get some basic policies established in the near future so we can formulate effective sales plans. I believe we have a mutual understanding of these problems so I do not feel it necessary to elaborate on them.

The most pressing problem at the moment involves aluminum rigid conduit. We have made satisfactory arrangements to sell this product which will keep us from losing our distributors to Kaiser or Reynolds. The fact that both Rome and Alcoa are actively and independently soliciting customers, however, is bound to compound a problem we must face in the future. Our reputation, knowledge and establish relationships in the wholesaling field coupled with the broad line we can offer is going to make up a very desirable supplier, but a necessary part of our policy is in my opinion going to be selectivity. We will have a great deal to offer a wholesaler but this advantage will be substantially diluted if we offer it to a great many wholesalers. We are going to be faced with the problem of weeding out wholesalers and retaining only those that can do a good over-all job for us. Knowing this, it seems rather impractical for Alcoa to be adding conduit consignees that may have to be terminated if they do not fit into the over-all picture. Terminating consigned stocks is at best a very messy job and in the process we might well do irreparable harm to our relationships with some wholesalers we might want in the future. The new aluminum conduit price and the possibility of a steel strike may well precipitate a de-

mand for conduit that would put aluminum in solid. We should be in a position to take advantage of these circumstances to establish and strengthen our position with good wholesalers, but this may be impossible to do because Alcoa's capacity will be spread around the country with consignees that we cannot build for the future with.

I will cite a case that illustrates the problem and I think points up the necessity of getting this matter settled immediately. As you know, we have never had good distribution in Maryland. The largest and by far the most desirable distributor covering this area is Tri-State Electrical Supply with a house in Hagerstown, Baltimore and Cumberland and branch houses in Chambersburg, Frederick, and Harrisburg. The ink was hardly dry on our affiliation agreement when I had a call from an old friend who is Executive Vice President of this company. He expressed interest in working with us and stated that he was going to concentrate on the thirty utilities and R.E.A.'s in his territory. He, therefore, was interested in the supplier [fol. 5624] that had a good reputation with the utilities, which we have, and, also, one who is a prime producer. He said we looked like the kind of a supplier with the kind of broad line he wanted. I stalled him off saying that we were going to be selective and that when we did enter into an agreement it would be on a partnership basis and that we would offer our broad line in return for preferential treatment. In other words, we would expect a good share of his regular business along with the overhead conductor he expected to get from the utilities. I also mentioned that aluminum conduit would be a very desirable part of our line, thinking I had a trump card to give him some food for thought. My plan was to bargain with him, our line including conduit for a substantial share of his over-all business. He called me back a few days later stating that he had signed up with Alcoa. He, also, expressed some concern over the fact that Alcoa recognized Line Material in Baltimore as a distributor and, also, that they had conduit consignment with some other small distributor in or near Baltimore. While I still have hopes of working out a deal with this customer, it is too bad that our hand has been weakened by dual effort. The sales advantages that Alcoa paid for cannot be realized if we continue to go our own

2439

ways. We all realized that the affiliation would cost both of us some business, but I fully expect that we will gain more than we lose. Unless we can come up with a coordinated sales effort the effect will all be on the negative side.

Very truly yours, Jr.

JRW:reh

[fol. 5625] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 348

J.J. SmithCOFFEE MEETING
April 20, 1939

PRESENT: J.M. Dyett, D.H. Thayer, G.W. Comerford, T.D. Bylin, J.S. Penderf, F.S. Marks, Jr., R.G. Poole.

ABSENT: G.E. Rolston.

JND mentioned that the copper market was weaker than it had been earlier in the month. The producers were selling at 31.5¢ and the custom smelters at 32¢. The metal is still in short supply.

In a discussion on INVENTORY JND pointed out the 17% increase over a year ago in in-process stocks; the 20% decrease in consigned stocks; and the 14% increase in some finished stock. It was felt that the increase in some and a decrease in consignment showed a better disposition of finished goods.

The production in April is ahead of sales, with the exception of weatherproof. Some of this apparent overage in rubber covered is due to the late tabulation because of tab machine breakdowns. The total order backlog is down 900,000#, mostly reds.

JND discussed the production and stocking of aluminum building wire at Rome and asked RGP to set up economic runs and inventory requirements. It appears that in order to meet competition, we are accepting orders, but will try to run economic lots. CHE stated that he did not feel the shipping room could stock any more than a very nominal amount of such wire without enlarging the present space. JND said that as this program gets further along, we will have to analyze the possibility of such increase in space. It was not clear whether the sales department intends to stock at field levels.

There is expected to be approximately a 300-400,000# increase in rubber covered stock in April, and it was felt that our production should equal sales in May.

Through the 20th, transfers to rubber covered finished stock are 1,110,000#; ship out 946,000#; and transfers from bare wire to rubber covered 1,403,000#.

The following figures were given for May and June sales:

COFFEERods-Regular
-FullBare Wire-Fab.
-Misc.
-Full

MAY

JUNE

MAY	JUNE
1,460,000	2,000,000
2,100,000	2,100,000
360,000	500,000
550,000	600,000
85,000	100,000

1662
300

84 out - 5/16
121 - 1/16

out 500 prod

133
40
73 - 100

- 122

122 - 122 want can expect

[fol. 5626]

Copper Meeting
April 20, 1922

May and June sales(continued):

	May	June
<u>Weatherproof</u>	185,000	185,000
<u>Magnet-Paper & Cotton</u>	115,000	145,000
-Glass & Asbestos	60,000	60,000
-Formvar	100,000	110,000
-Toll	-0-	-0-
<u>Rubber Covered</u>	1,600,000	2,000,000 (complete original)
-Toll	15,000	15,000 (1500)
<u>ALUMINUM</u>		
Rods	40,000	40,000
Bare	90,000	90,000
Weatherproof	-0-	-0-
Rubber Covered	190,000	190,000
Toll	160,000	160,000

Copies to: A.D.R. Fraser
 P. Lopushinsky

HFP:AF

1772
 1100
 490 Sales
 1450
 4512

1900
 1130
 490
 1450
 4970

PLAINTIFF'S EXHIBIT 349

COVER MEETING

JANUARY 22, 1960

PRESENT: J. V. DENT, G. E. HOLSTON, C. W. ELLIS, T. D. STAIN,
J. S. FENDLEY, R. G. POOLE.

ABSENT: G. W. CONNERFORD

GER mentioned the competitive situation with respect to building wire and said that RCT was 15% above the industry up to the price change of 1/21/60. He reported that St. Paul Warehouse was virtually selling nothing and other warehouses were in similar positions. The new price level has placed us competitive or 5% above some companies, a situation with which we can live. Fewer cables have shown a further decline, selling 20 - 30% off the sheet.

JND said that the order backlog was down 30% since January 1st, mostly due to not selling as great a volume of rods. R/C sales through the 12th billing day are only 60% of the budget. Magnet is off due to lack of orders.

In a discussion of finished stocks, JND said that they were high in relation to the current and expected sales volume. Therefore, it would be well to reduce production of construction wire types until sales pick up. It was decided to produce approximately 200,000 lbs. less than the expected R/C sales in February.

The receipts of copper in February will be approximately 1,200,000 lbs. unless the strikes are over; in which case up to 4,500,000 lbs. may be received.

GER asked about aluminum building wire stocks. Schedules for TV and HW braided wire have been started in the mill and sheets for RND will be sent over by George Campbell as soon as estimated sales figures have been received from Dwight Thayer. (These were promised on January 25.) TDS was asked to rush these through as soon as possible.

Ordering amounts should be reduced on regular scheduled items by George Campbell (this was done on 1/25, with the exception of Reflex since we are still considerably backordered for most sizes). The sales figures now being used are about 40% lower than 1958 volume. A check with GER will be made the middle of February to determine whether the sales volume is changing from the estimated budget.

Magnet stocks should be kept up since GER stated that we would not get any orders unless we have stock. Customers can get immediate or 3 - 4 day delivery from competitors and will not wait for manufacturing time.

TDS asked whether this was true about Weatherproof. GER said he would review the situation and advise, but that using as a guide the last three months' sales would give the Production Department approximate figures for saturated and finished stocks.

[fol. 5628]

Copper Hoisting - Jan. 22, 1960

Through the 21st the Rubber Covered transfers were:

Bare to R/C	1,100,000 lbs.
R/C to Finished Stock	996,000
Ship Out	714,000

The following sales figures were given for February:

COPPER

Rods - Regular	900,000 lbs.	300,000 at 35-3/4
- Toll	2,000,000	300,000 at average cost
		Westinghouse - we will use
		600,000 of scalped instead
		of 500,000.

Bare Wire - Feb.	260,000
Reg.	550,000
Toll	235,000

M/T	175,000
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Magnet - Paper	125,000
Glass	10,000
Cotton	15,000
Farwar	125,000
Toll	31,000

R/C	1,300,000
-----	-----------

Production 1,000,000.
Hoisting starts are expected
to be off in 1960 - competitive
situation

- - Toll	25,000
----------	--------

ALUMINUM

Rods	25,000
R/C	215,000
Toll	190,000
Bare	90,000

March is expected to be the same as February with the following
exceptions:

Magnet	350,000
- Toll	15,000
R/C	1,400,000
Rods Reg.	1,300,000

RGP:AS

April
RGP:AS

[fol. 5629] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 350

April 26, 1955.

Internal Correspondence

From: R. R. Cope
Sales Development Division
New Kensington

To: Memorandum

Re: Edward Ashley Associates

Ref: Aluminum Insulated Power and Feeder Cable

We intend to ask the captioned to undertake an engineering study to determine the economic aspects of the use of insulated power cables in multi-story office building construction and in industrial plants. This memorandum is being written simply as a guide in making a proposal to the captioned for this work.

Mr. Rodee of Edward Ashley Associates indicated that they would be prepared to make a study for us and that they would use information which they have generated not only in our own plants but in other plants and office buildings which they have designed. We feel that aluminum should be designed on the basis of aluminum's characteristics and not on the basis of a preliminary design in copper and then a substitution for equivalent current carrying capacity.

1. Compare the costs of an aluminum system versus a copper system for multi-story office building construction using some typical building. This study should include comparisons of insulated power and feeder cables, vertical bus risers, and the branch circuit conductors used for lighting.
2. Make a cost analysis to compare aluminum versus copper in the construction of a typical industrial plant. Such a study should include a comparison of power and feeder cables, control wiring, and branch circuit wiring.

[fol. 5630] The fact that aluminum weights one-half the copper conductor for equivalent current carrying capacity, makes it possible to use aluminum conductors in self-supported spans from roof trusses without the need for large conduits. Also in industrial plants, cable troughs can be used to advantage eliminating the need for increasing the size conduit to accommodate the larger aluminum conductor. We are in hopes that this can be taken to account in their engineering study since it will be reflected in the installation costs. It is certainly our intention that the cost figures represent the installed cost of aluminum versus copper so that this information can be used to promote the sale of aluminum wiring with electrical contractors, other consulting engineers, architects, and electrical inspectors.

R. R. Cope

RRC:mas

[fol. 5631] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 351

55 Sales.

R. A. Schatzel

General Engineering and Research Survey

I think we are ready to start the Engineering Session, and I would like to add my greetings and pleasure at seeing you all again. I hope that we can make this Conference of real value to you. I hope particularly, that we will be able to give you some of the answers that you have come here to get. In order to do that I will limit the general remarks that I might make to just as few as I can, and get into the meat of our discussion. Distributed around the table is a list which I have headed "Topics". I don't expect to cover them all, but it is hoped by your interest in these topics, or others, that you will be able to guide us into the things you want to have covered.

First of all, before we enter this list, I would like to just mention something of our Organization and our changes, and some of our plans. Last year you know I told you that we were endeavoring to, and had perfected three organiza-

tions, of which I was primarily a coordinator. The Engineering Department under Mr. Graham as Chief Engineer; and you know how effectively he has been operating in that; he, together with Mark Wolf are running the Engineering Department. Of course in the Laboratory I don't need to tell you that Mr. McCutchan has been doing his usual good job, with a tremendously increasing number of problems.

During the year 1954, we set up a department under C. H. Ellis, a Technical Superintendent in which we transferred Austin Woolley. This was to permit a closer and more complete technical supervision of the day to day plant problems that arise in manufacture, all of which were carried out by the Laboratory. The Laboratory had a sporadic and a multiple type of authority; sometimes none, but at least the multiple responsibility. This change, I think, places the responsibility, authority, and the command where it belongs and allows for improvement in manufacturing control. During this past year—Charlie may cover this—I think we have greatly strengthened that department. One of our students, Mark Dollard, and one of our previous students, Joseph Duffy, are there, both competent and capable engineers. We hope that department will be further strengthened.

"Now how does that tie in with the Laboratory? The Laboratory is able to devote its time on service, and can strengthen its service of development and research. We have made some steps this year in strengthening the Laboratory; not as much as Mac would like, but we've made a step in that direction. We have transferred from the Laboratory one of the most capable of our Engineers—one of our former students—Ian Marwick to strengthen the Electrical Section. We are strengthening the Insulating Section of the Laboratory, and during the year we hope that the functions of the Laboratory will be departmentalized into a group of specialists developing greater efficiency along these particular lines. I won't try to outline what I mean, expecting this—we have not just one Laboratory—we have an Electrical Laboratory, we have an Insulations Laboratory dealing with plastics and complex chemical materials, including rubber. That's one group. We have a Metallurgical Laboratory, we have a Product Development and Testing Laboratory, and we have an Analytical and Control Laboratory, all of which are coordinated and directed under our

Research Director, Mr. McCutchan, and his Staff. Those, I think, are improvements in Organization that we have under way.

We believe we have greatly strengthened our Inspection Department. Starting last year we had an addition there in a testing group under Bill Griffith, who Mr. McCutchan had trained and who had been further trained in our experience in Spiral 4. All of our products that go through the mill today are sampled on regular schedule and tested, and we get weekly and monthly, a uniform report which gives us an idea of the quality level that we're running. We have a pretty good check on sampling tests because the Laboratory itself picks up some samples. In this way we are building up a history of quality.

Now we are trying to tie that in with another development taking place which we mentioned to you in industry, and that is the development of Statistical Quality Control, which we have put under Ken Hamlin. More and more Industry groups are interested in that, and we are trying to write it into specifications so that instead of asking for all of the certified test reports, and having to sample from each individual order, we are gradually getting acceptance of an idea in Industry, that they will accept a certified report that this product, made on a certain basis, conforms to a quality level experience of the plant. This does away with a great deal of this individual and expensive testing. We have that written in IPCEA; we have it written in some A.S.T.M. specifications. We have Quality Control committees in both those groups, and we are trying to tie in that customers will accept evidence of a quality level performance basis of the plant in lieu of specific tests on the order. That puts the plant that's doing a job on a little different basis than fly-by-night people who cannot, and will not, keep that type of a record. So I think that overall we are making some progress.

The Laboratory has aided tremendously in furnishing personnel, as you can see, for all of these efforts. In the meanwhile we have the responsibility to replace and strengthen that personnel.

During the year as you know, Gray Howe has been very sick. I haven't seen him as much as I'd like to, but I wrote him a note within the last few weeks and had a call from

him. I asked this, perhaps when some of you fellows were here, and you had an opportunity, he'd feel like seeing you and he said he would be very glad to. So I hope that any of you that might be up that way and could stop in, will do so. I know he'll be glad to see you.

One thing I want to mention which is very important is that Phil Isom has been carrying on as the active head of the Inspection Department. He has done a very fine job. He isn't here this morning, but I wanted all of you to know [fol. 5633] that Gray has a good man pinch-hitting for him.

I think that covers generally our changes in Organization, with one exception, that in our Quality Control group we have taken on a student who has a Quality Control background and he, we believe, will help strengthen that particular function. With the assistance of the plant, the Quality Control group have taken over the process control. We have process inspectors, and we have finish inspectors. Process inspectors were reporting to Production and they were responsible for quality levels too. All of that has been put under the Quality Control group, and at the request of our Production Department we are trying to extend that activity into as many departments as we can. I think we're making progress. I think a good deal of it is not alone responsible or not alone credited to the Quality Control group, but to Production and particularly to Frank Baumler who has been following it very closely.

In the field work during the past year we have tried to keep Bob home a little bit more, but I think you'll testify that he's been doing the usual good job and spending just about as much time in the field. So is Mark, but between them I think they have been here enough so that I could get away once in awhile.

Mike Kopchik has extended his activities to a greater extent, Field Engineering, and during the past year he was also our schoolmaster. He took care of our Students, as well as the Mining Cable with Dick Gray and Gil Lipscomb. He'll have something to say about that. We hope during the year that we can extend that work somewhat. I believe we are a little better organized, and I think some of you have also seen Ed. Duffy out in the field once in awhile. Unfortunately we still have complaints and Ed we have

here as a trouble-shooter, and in each case he has done a very fine job. Backing them up is Lew Selden to take care of the Underwriters' activities and some of our other NEMA activities, and Mert Williams of course, together with Sid. Mills. We also have in the Engineering Department one of our Students, Dick Coop, and he is holding down a regular job there now. I think we have our Engineering pretty well organized and you can look for at least as good service as in the past year.

I'm going to digress a minute from the sheets I sent out to you, and mention one thing that comes under the item of Bulletins. Last year we told you that we would endeavor to get a list of those Bulletins up to date with the obsolete ones so that you could simply organize your book and keep it current. We have that accomplished now. We also said last year that we would try this year to have something to say at this meeting on a new addition of the Manual. We have something to say but we don't have a new Manual. We just haven't had the manpower or personnel to do it, but we believe that during 1956 we can get a new Manual. We have a great deal to put in it. Our present Manual is in many ways obsolete. Of course, all our references to In-[fol. 5634] dustry Standards are today obsolete. Most of the data is good, but incomplete. We have to have a completely new section on Aluminum. We have to have a section on Splicing. We have a considerable number of new tables that should be included. All of that is going to take a tremendous amount of work, but we hope to have it completed in 1956 and ready in 1957 which will be the tenth anniversary of the first edition. That's the best I can tell you now.

Now I would like to take up this list of Topics, and I see I have pretty nearly run out of time. We will run over these topics and cover the ones that you have the most interest in. The first one I have is Aluminum, and I'll mention what I want to and then ask you to bring up any questions you want. Understand that Bob will cover some of the details on this. The reason I have put Aluminum at the head of that list is that I know you've already seen a tremendously increased interest in the field. I've talked to a number of Utility engineers. Bunky and I were talking to one last Tuesday, and he repeated what many of them have repeated

to me, and which was quite contrary to what I've heard before. It is not, "Why should we use it", but "Why don't we use it?" "How can we use it?" And that is the changed attitude on the part of Utility Engineers.

A few years ago I told you that you can't change the elemental properties of a metal. Aluminum has one set of properties, copper has another, and all the bunk in the world can't change it. They have certain advantages and they still do. The properties of Aluminum are not changed at all, but the economics are, and in Engineering I think we have to recognize two sets of facts. One is the technical side, the other is the economic. When the economic pressure, the economic advantage, is great enough, I think we can find Engineering ways to do things. The Engineer in Industry and Utilities have reached that point. So you're going to see and already have, a tremendous interest and willingness to use Aluminum.

In Bare wire many groups are using hard hard-drawn Aluminum transmission lines, replacing ACSR. That is done particularly in Southern California, it's done in Philadelphia, and it's done in many of your Utilities in the South, and it's done for several reasons. The primary one is economics and ease of handling and installation, and the reliability of it has been quite well proven. So I think we can see an extension of that.

You've heard quite a little bit about Aluminum Alloys; I think the Kaiser Alloy is the principal one. On that I only mention it to give you the reasons why we haven't been quite so interested. We may have to be, but we took this up with the Aluminum Company over two years ago. We also took this up at a meeting which we had all three aluminum companies present—Reynolds, Kaiser and Alcoa—this subject of why they couldn't provide us with an Alloy similar to that being used in Europe under the name of Aldrey in England; Similac in France.

[fol. 5635] There are several other metals, and they're all about the same thing. They are a Silicone-Aluminum Alloy having about 55% conductivity instead of 61%, and a tensile strength of about the same as hard-drawn copper, or a little higher.

Now the reason that we have not been so interested is first, it's difficult and costly to process. It needs a heat

treatment. The second thing is that used in the hard-drawn condition, it has what is known as a very low "notch resistance". Give it a scratch, and bend it, and a kind of fatigue starts which develops into a complete crack, right through the metal. Now, during the past year you've seen recognition of that. You have seen recognition of that in the fact that Kaiser has brought out their ND-1 Alloy and it's identical. I have not had it analyzed, but it's a Silicone Alloy, the same as has been used in Europe under the names Aldrey and Similac. Kaiser have not listed it in a solid conductor form, but supply it only in stranded; and the whole reason for that is to minimize in the hard-drawn form this cracking or notch extension when you get a scratch on it. If you have a scratch on one wire you lose one-seventh of your strength, not 100% as you would in a solid conductor.

Since this has come up we have taken it up again with Aluminum Company. In view of the fact that they have been slow in the development of their steel covered aluminum, and which they had discussed with us two year ago—we've taken up with them now that we've reached a point whether we should now consider an Aluminum Alloy, Aluminum Company and ourselves. If your development of this Aluminum covered steel is going to continue to be indefinite and slow, shouldn't we both supply this kind of an Alloy? We have back from the Aluminum Company an answer that as far as they are concerned, their opinion is the same as it was—that we could do it if we wanted to and they'll supply it, they make it. But our feeling is that we are not in position where we would want to take the responsibility in view of their technical advice. Now we can't knock another fellow's product and we're not so sure that some of these types of criticisms in the alloys can't be overcome. They have another reason which we think is more compelling than that. They say that this alloy which Kaiser is furnishing is too expensive; that while Kaiser is furnishing it they think their prices are altogether too low, that it will cost much more.

During this I've mentioned this Aluminum covered steel and you've heard of that as ACSW. ALCOA are still in a development stage, and I'm convinced they are. They have just ordered a press to be installed to make that material.

So whatever you hear about it now—Glenn or Fred has written you, and we've kept pretty close to it, and we know at Massena they do not have a press. We know that the press at New Kensington which they are making this on is not one built for that purpose. All the material is being made at New Kensington and sent to Massena for drawing, and so it is still a developmental material. We believe though, that eventually it will be a very worthwhile material once it's completely developed.

Now I'd like to go just for a minute to aluminum insulated conductors. I've listed here primarily building and power. The same problem exists as far as use in building wire as has in the past, and we've talked about it at your previous meetings. The problem primarily is connectors and the training of men that handle them. But we believe that aluminum building wire or aluminum wire for power uses, if confined to larger sizes, we prefer No. 1, but it may [fol. 5636] be that No. 4 or something like that would be agreeable. They are going to be used because the economic advantages are there and in those larger sizes the connectors have been developed; the service records are good, and we have the type of material that can be used.

We also know the types of things we'll run into and the types of faults we'll run into. What I would like to warn you about is power cables, either overhead or underground. As long as it fits the economic picture it is going to be used. It does fit the economic picture today, and this engineer in Philadelphia said if we get to using it we will find the bugs and correct them. That is a completely different attitude than the Utilities Engineer has had and it's true, we have always had that ability. There's one thing though that I would like to warn you of and you in turn, the people you are dealing with. We've had it come up here in two or three cases. We've had samples sent in from the field which we are very glad to get and which we had talked to you about before, and which we want to compliment you on now. We are getting samples from the field and these samples came in from competitors. I think it was a compliment to our Sales force that our Engineering friends gave them samples of competitive cable and said, "Here's some cable that isn't yours, but we bought it and we've had trouble with it, and it's aluminum—one case Service Entrance Cable. Other

cases have been weatherproof and if we bought your material, would it be any different? Is this something that could be corrected?" We have had to go back and tell them in each case it wouldn't make any difference who you bought it from, it's inherent in the aluminum. In each case, no matter how good the insulation is, whether it is Polyethylene, the best rubber we can make, whatever it is; if you get a hole in the insulation and it comes near the ground, you're not going to have just an out; you're going to lose your conductor. Now you don't do that with copper, but you do with aluminum; you have corrosion and you'll have it turned practically into a white aluminum powder. Now that's going to happen whether we make it or whether any of your competitors make it, and so we've got to advise anyone that comes to us with that kind of thing that it is a property of aluminum. That's a calculated risk you take in making and using it; and if we don't do that, if we supply them with some idea that we can make an insulation that will overcome conditions like that we are going to be in interminable trouble. We believe that Industry is willing to recognize its deficiencies and use them in spite of it and that's the position we're in.

I think on Aluminum Magnet wire we've had indications that it will be used in fixed equipment. Whether it will be used in rotating equipment or not, I don't know. Mark and Glenn will have to talk to you about that, because up to the present time vibration and fatigue have been too great a hazard to overcome in rotating equipment. So in a transformer, fine—in a motor—no. I have some question about [fol. 5637] that. I understand that General Electric had used quite a little of it in motors, and I understand that Ford is using it in starting motors. So any statement that's made without qualification, you could probably prove me a liar in ten minutes.

We're going to have more use of aluminum in flexibles. I put down the word flexible because we've had a considerable interest in certain welding cables and it won't stop there. Wherever a flexible cord is handled, where size is not important but weight may be, I believe we've got to begin to look at aluminum and that takes in quite a field. How far that will extend is going to depend again on con-

nectors, and there have not been any suitable connectors developed yet for that type of service.

We are working with a committee that will put into the Code new current-carrying capacities for aluminum. We have practical agreement on that now. Those were developed in IPCEA and I believe that very publication of that will give more impetus to the extension and use of aluminum. I have already mentioned the limitations.

Now can I stop for a minute, and ask if you've got any general questions on that subject?

HSW—Rudy, when you mentioned that you might get corrosion of the whole insulation and you might lose your cable, do you mean lose from corrosion only, or might get a short circuit? RAS—Well, it will be used, lost both ways, Skip—it can be lost completely from corrosion. We've had samples in here where the wire was completely intact; hadn't been burned, but with moisture entering and with just a slight urge, that that material was so brittle it could be just picked out of there. HSW—Rudy, what do you mean about a hole? Do you mean a hole in the insulation? RAS—I mean pinholes, or a damage in the insulation. Damage can occur during installation and can occur during service. It never occurs during manufacture. HSW—Is the rate of corrosion greater on all aluminum or ACSR about the same or what? RAS—Well, that depends on the cover. HSW—What I'm talking about is covered conductors. Well I mean covered ACSR. RAS—I should say it would be the same. The aluminum would react just the same as aluminum. HSW—Primarily electrolysis? RAS—Primarily electrolysis, that's right. But it's very susceptible. CRE—You spoke about connectors for Welding cable not being developed. RAS—That's right. They're not satisfactory and a great deal of work is being done. AKB—Rudy, are we regularly making aluminum Magnet wire? RAS—We have made flat Magnet wire and I think we'll take orders if they're big enough, won't we Glenn? GER—We're going to cover that. I'll cover the commercial part. RAS—So you'll get that answer.

Now, might I just hurriedly run down a few of these things, because I want to leave some time for the most important part of this program. That's the reverse lay Aerial cable. I only need to say that we have a license. We are

building a machine. Charlie has been very active on this, and I know I've had needles from you fellows during the year on when we're going to be able to supply. I think that it will take some time to get that machine built. Charlie might touch on that with you, but we're preparing to be in position to supply Aerial Cable, reverse lay. I think that [fol. 5638] you are also aware of the fact that Aerial Cable is getting more attention today than I think it's ever got from Utilities.

Butyl Rubber. I simply will admit now we've had a whole lot of trouble during the year—a lot that we didn't anticipate. I think that is probably natural when you get into a material that is as tricky to handle as Butyl is, and to start real volume production on it. You find a lot of things that you didn't know, and that's our position now. We are working on them and I think when you go through the Laboratory Mac will have some samples out there. But rather than samples I think I can tell you that both the mill to the Technical Superintendent's department, Laboratory and the Mechanical Engineering Department are putting that on the top of their list. There are mechanical changes that have to be made in our equipment before we can satisfactorily process it. Those are being pushed just as fast as they can. I've listed here RHW because that's a Butyl problem. Someone wrote in and asked when we would have approval. We've had approval for months. But until we are satisfied that we can completely and satisfactorily process it, we have not spread that information or taken orders. We've taken one or two because we thought we needed that to develop our experience. That, I believe, is closer to solution than the high-voltage. The RHW is not far off, so we expect to have something for you shortly. On that again, it's a mechanical and processing problem.

High-voltage Butyl during the year has developed quite a lot, and our competitors have made some improvement. We told you last year that there was one competitor that had a good product, about the only one we would be satisfied to sell. That isn't quite true today. We've seen at least one other competitor that has improved their Butyl high-voltage insulation and we don't doubt that there are others. As a matter of fact, we have one of our own; that if we can

get satisfied that we can process it, we're quite satisfied to offer.

At the next AIEE meeting in Chicago which will be next month, there's going to be a tremendous pressure on this Butyl problem, and our RoZone and oil-base insulations generally are under attack. They're under quite serious attack, largely because of heat resistance. At the next AIEE meeting there will be three papers presented on Butyl and in each one of them oil-base insulation will be directly compared to Butyl and undoubtedly that will have repercussions throughout the year. Bob, at the expense of encroaching on your time a little bit, I'm going to just mention some things which we feel in regard to these particular papers and in regard to this type of attack which is perfectly justified if held within proper limits. We believe that the better method would be to go out and make a positive statement about Butyl, and leave out the question of competitive materials which are oil-base. Now our statement on that is this, that we're talking about high-voltage cable. Butyl rubber, as far as high temperature is concerned, there's no question about its being better than any other rubber that's been developed for high temperature. That cannot be questioned successfully until you go to Silastics. [fol. 5639] However, we're talking about high-voltage, transmission of electrical power at high voltage. The successful use of rubber as an insulation in transmission of power at the high voltages has been due entirely to oil-base insulations. It is the only material that has been used up to a few years ago, so all the experience, all the history of the electrical industry in the use of rubber, the high-voltage has been based on oil-base insulations. And as we've gone along through those years, that experience has been good. It has weeded out all competitive material.

Now we come to a new material developed and we present a great deal of Laboratory information of tests at high temperatures, etc., which show that the oil-base material which has been used successfully, is not good. Whether you've got a problem there, you must admit that tested at these high temperatures, which the other material will stand, it does not show up good. But this isn't the way that oil-base insulation has been used. It has been used and recommended at a lower range of temperatures, and when

properly used, has back of it a very satisfactory experience which Butyl does not have.

When you have a group of Laboratory tests which deny your experience over a period of years, what do you do? Throw out your experience, or question your Laboratory tests? Question your interpretation of the data? I think that most engineers, most sensible people, will go back and examine their interpretation of the data, and if they do, believe they will offer this conclusion—that the most reliable insulation for high voltages to use at 70 degrees and lower is oil-base. If you have to engineer a job, if you have to make a decision on an application where a temperature higher than that must be used, you have every right to use Butyl. If you want to use the material within the range of 70°, you have a right there to do whatever you want to—you can use Butyl or oil-base. In one case you're going to place your credance on your Laboratory tests and in the other case on your experience. I think that is the only way that we can answer that type of thing, and that is the thinking that we have that guided us. So I give it to you for whatever it might be worth to you.

I'm going to mention one other item and that's TreePlex, because I believe that the others will probably be all touched on in our discussions later. TreePlex of course is our Polyethylene with Nylon sheath. At the time that we brought that out we believed, and still believe, that it was a very fine product, and fine development. We ran into two things with it that we have had to back off on. One is the extrusion of Nylon on large sized conductors. We're making Nylon you know, regularly on your Control cable. We supplied a great deal of it for Field Wire. It is the Standard of the United States and every other NATO country, and stored in all the world. Every company that makes Field Wire extrudes miles of it every day; we did. We extended in the Laboratory and under Laboratory control in the plant its use up to larger sizes. However, when we come to turn it over to regular production, even under Laboratory control, we could not satisfactorily process it. We've tried [fol. 5640] various types of mechanical improvement we could think of; we had every assistance from the Production Department that we could get off from everyone else, and it just didn't work. So we have to correct that part of it.

The next thing was that we had some disturbing evidence. The Signal Corps after all these years, used it during the war, ten years afterwards, standardized on it in every country, and had commissioned Battelle Memorial Institute to conduct an investigation on aging of Nylon. Battelle came out with a report that we believe today and so does duPont, that it is a very academic type of thing; but nevertheless it had a tremendous influence, in which they said that Nylon would age two years. Certainly for a wire covering we cannot rely on material that would age two years. The criteria of their judgment was, after aging under ultraviolet light for a certain number of hours, which was equivalent approximately to two years, it would crack when bent at minus 40° . Now for Tree wire we don't care whether it bends initially at -40° . Very few of the tree wires that were ever made have coverings that will withstand bending at -40° . However, the whole age-resistance of Nylon exposed to weather was under question.

We've attempted to clarify that with duPont, calling their attention to the wide use and the fact that they had investigated the material, and that they had publications out which mention excellent weather resistance. We called it to the attention of duPont, and we've had a series of letters from them. In one of these in answer to a letter I wrote them, I had a letter back on May 5th of this year which stated as follows: "A critical analysis was made by our Research Laboratories after a nine-year Florida exposure of Nylon containing Carbon Black. This particular data was based on an 11 mil Monofilament which showed a moderate dropping off in tensile strength and elongation in a few years, but then leveling off at the end of the nine years, still retaining 45% of the original tensile strength and elongation at -23° ." They were good enough to tie a knot, etc. We asked them then to see the original research data, which they agreed we could do. I'll make this story very short now in saying that duPont have agreed and have been co-operating with Mr. McCutchan in actually coming into our plant in running Nylon; developing Nylon that will run, or helping us to correct whatever conditions we may have here to run it, *or helping us to correct whatever conditions we may have here to run it*, and at the same time, extend this research into aging, and to supply us with the original

data on which these statements of life is based. When we get all that tied together we will then make our decision of starting up on TreePlex again. So before we go out again we're going to have a good story on the aging as well as being able to process it.

In the meantime we have had other developments of improvements in Polyethylene itself, in which we feel that perhaps by the time we have this corrected we may not need it. We may have a Polyethylene insulation with much better abrasion resistance and requiring no outer covering. Now that's the story as it exists; I'll be glad to answer any questions [fol. 5641] that you might have.

Now there's one subject I want to mention here. Many of you have written in about 5 KV unshielded cable. Bob has mentioned our report which we sent out. The report establishes things that we all knew, but puts down in very definite form the risk that we're taking. The Laboratory is still conducting investigations, a more complete investigation, which we hope will become a paper we can publish in the Industry and then have the Industry itself know, which I think some may not, but there is a calculated risk. We're taking that calculated risk when we're supplying unshielded 5 KV cable. Yet for 4160 whenever we know what the particular installation conditions are we may have to broaden that during the year, but we want to control it as much as we can. I don't know that we'll ever be able to change the picture because there are as this report and as our experience shows, a great many places where 5 KV unshielded cable is satisfactory, but during the year we hope to clarify that picture and certainly we're going to continue to meet competition. I think that in general, that covers everything.

HWS—Rudy, the August 8 issue of Electrical World had an advertisement by Okonite—if you haven't seen it, I've brought one with me—why Okolite conductor, etc. Can you elaborate on that a little bit? RAS—No. I think I can't, we have looked into that, Okoloy coating is a lead coating in the place of tin, and this is the general picture; with these oil-base compounds we do have compounds with a rather high sulphur content, and when we have moisture present, in the presence of moisture, with sulfur, we have sulfuric acid and sulphuric acid formed which will etch and destroy tin. It will do the same thing with lead, but slower. Now the part

of that is this—when you get water through an insulation and onto the conductor you've destroyed your insulation anyway, and so you just want to keep water out. So any time that you operate a cable with water on the conductor and insulation over it, you've got a cable that's going to fail no matter what the insulation is. So this is purely an academic question:

[fol. 5642] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 353

L. H. Hemeter
Pittsburgh Office

February 20, 1956

District Managers—Asst. Managers
Branch Managers—Cable Salesmen
Field Advisors—Product Managers

Sub-Committee on Electrical Conductor

R. V. Davies	J. L. Patterson
F. L. Magee	H. L. Hall
D. Wilmet	N. M. Kehew
R. B. McKee	B. S. Henderson
J. P. Haight	J. W. Hood
A. P. Hall	R. L. Phifer

Masena

J. H. DeKlyn	D. Paro
L. M. Arbogast	J. R. Ibach
H. D. Lockhart	H. S. Marando
D. L. Mayne	C. Weegar
P. H. S. Chapman	Wm. Hall
T. L. Gilbert	C. B. Travis

J. C. Yedlicka

Vancouver

E. D. Mairs	J. P. Lamoureux
J. T. Barclay	D. Barney
H. E. Young	
R. C. Kasser	H. H. Gnuse
New Kensington	Franklin

Electrical Conductor Division Newsletter

The aluminum weight of bare cable produced in January was greater than for any previous month since last August and was 10% above the weight for December of last year.

New orders for bare cable received in January showed an increase of 39% in aluminum weight over the previous month. Although the January total was considerably below

what we would have liked to receive, January was the best month since last September.

Orders for 100,000 pounds or more aluminum weight were as follows:

Customer	Aluminum Weight Pounds
Consumers Power Company.....	1,000,538
Graybar Electric Company.....	177,574
Indiana Power & Light Company.....	220,431
Pennsylvania Electric Company.....	200,634
Priester Supply Company.....	130,652
Savannah Electric & Power Company.....	175,923
Toledo Edison Company.....	101,134
Westinghouse Electric Supply Company.....	108,961

[fol. 5643] The aluminum weight of covered conductors for January was down when compared to December of last year. New orders were down 10%, bookings were off 15%, and shipments were down 19%. However, when compared with January of last year, bookings showed an increase of 140% and shipments, an increase of 30%.

Competition, like death and taxes, can never be avoided; but through the years it does change. Before World War II our conductor competition was with copper whereas today it is with other manufacturers of aluminum. To sell a transmission line years ago our peddlers, and we had some good ones, often were faced with a lower copper price per mile than the price for equivalent ACSR; and as a result they had to show that the cost per mile of completed line would be less with ACSR than with copper. They had to consider the cost of supports, hardware, and stringing as well as the cost of conductor. To prove that copper is a has-been for bare transmission lines, consider a 138 KV, 100 mile, three phase line on steel towers, using 556,500 cm ACSR 26/7 or 350,000 cm copper as the conductor. One of our tower designer friends tells us that based on a tension of 40% of the ultimate under heavy loading conditions the approximate average span for 556,500 cm ACSR would be 1000' and for 350,000 copper, 750'. This would mean an average of 1.77 more towers per mile for the copper than for the ACSR resulting in an addition of 20 tons of steel per mile at \$.15 per pound and \$100.00 per ton for erection costs. It is assumed that stringing costs would be about the same for both conductors. The net result would be that the copper cable plus extras for steel costs, erection, and insulators

would total \$1,646,577.80 as compared with \$395,503.20 for the ACSR; the cost of copper cable alone would be 209.91% of the cost of ACSR.

[fol. 5644] We recently completed tests on compression dead ends, similar to the Cat. 900 series, on 5/16" and 3/8" stranded steel conductors, using both a Model B and a Model 12-A compressor for making the compressions. The same dies were used as are required for the Cat. 1070 series compression joints for these ground wire sizes.

At the time tests were made only one customer was involved; but if any of you peddlers know of anyone interested in these dead ends, test results, design information, and prices can be obtained from F. R. Dallye. If the demand justifies it, these dead ends will be shown in our catalog data at a later date. Incidentally, the efficiency of the dead ends was comparable to that of the compression joints.

At the recent sales meeting in Chicago several of you made inquiries about information required to evaluate a competitor's accessories and to design new ones of our own. Larry Flaughter has suggested the following procedure.

When you forward or inquire about a competitor's accessories, we can best assist you by knowing to what service the customer intends to put the accessory. Include with your inquiry the cable sizes involved, state which of our clamps will suffer if the customer starts using the competitive item, and tell what the customer can do with the new accessory that can't be done with one of our existing designs. To design new accessories, we would like to know (1) what accessory is needed, (2) what service is required of the accessory, (3) on what conductor sizes it should be used, (4) why none of our present accessories are satisfactory for the job, and (5) what competitor's accessories will work.

Please forward your information or sample accessories to F. R. Dallye.

[fol. 5645] One of our customers was recently caught between a rock and a hard place when trying to use dies for a figure eight-cable joint in an H compressor to compress tubular joints on Merlin. This combination has never worked in the past and will not in the future, but it was recommended by a "Service Engineer" not a Field Advisor. Perhaps the name "Service Engineer" rates above Field Advi-

sor, but at least our boys know their onions and would probably agree with the late Will Rogers that "Some people say eat that ain't et."

As soon as our present supply of cut thread U-bolt, used in our Cat. 280 series of parallel groove clamps, is exhausted and Lancaster can complete their tooling changes, rolled threads will be supplied. Rolled threads are superior to cut threads, and we want to use the best bolts available.

Until comparatively recent times very few, if any, transmission or distribution lines were strung under tension because equipment was not available to permit a good job to be done. Braking the cable reels so as to develop any real tension in the cable was not desirable and bull wheels around which to pass the cable were only used for special jobs such as difficult river crossings. Two or three contractors constructed some tensioning equipment to be used for stringing super-high voltage lines; but in general, lines were built the same way as in the past except that the cable was pulled out by cats or winches rather than by horses or mules.

* Some of our customers are now stringing lines under tension using Pengo wire tension stringing machines and we have received reports that these machines do a good job. The November, 1955, issue of "Electrical West" contains an article "Greased ACSR Is Tension Strung" which describes the stringing of a 220 KV 1,033,500 cm ACSR line of Southern California Edison Company using the Pengo machine.

[fol. 5646] Sales for 1955 of electrical conductors and accessories from consigned stocks amounted to \$4,121,600.00, a gratifying increase of 79% over 1954. Agency sales totalled \$4,117,100.00, also up 81% over 1954. Graybar had 48 stock locations at the end of the year and turned in sales from consigned stocks of \$1,527,900.00, agency sales of \$2,064,400.00, the total being up a comfortable 69% over 1954. We now have 9 Gesco stock locations, with consigned stock sales of \$349,900.00 and nationwide agency sales of \$424,200.00, totalling up a whopping increase of 188% over 1954. Wesco still had only 3 stock locations at year-end, but in January came through with a new one for Win Dow in Burlington, Vermont. Wesco consigned stock sales in 1955 were only \$69,900.00 but as agents the nationwide take was \$495,-

100.00 for an overall increase of 47% over 1954. An annual turnover ratio of 3.7 for all consigned stock distributors set a mark that will be hard to beat.

In the national sweepstakes for individual honors, the irrepressible Mr. Beck's Priester Supply Company of Dallas again wins in a walkaway with consigned stock sales of \$785,300.00 and agency sales of \$98,700.00, up 58% over 1954. Tom Tate's Line Material Company at Miami was a good second, C. D. Blair's Stuart C. Irby Company of Jackson, Mississippi, third and Mr. Beck tries to monopolize the winner's circle by bringing in Nelson Electric Supply Company at Tulsa a comfortable fourth. With a few exceptions, all of our distributors and agents are to be congratulated for their fine 1955 showing in a highly competitive market.

Distributor training course nominations are again in order for groups starting from New York on April 8, May 6 and June 3. You send us some good men and we will send them back well-equipped to sell Alcoa products for you.

LHH/elj

L. H. Hemeter

CC: PTC, HHR, FRD, DL, LTG, GHP, DHS, REL, LLF,
JWA, RRM.

[fol. 5647] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 354

Rome Cable
Corporation

Rome, N.Y.

April 6, 1956.

F. S. Marks
Sales Manager

To Our Bare, Weatherproof and Magnet Customers:

For many months the prime copper market has been in a state of confusion. Instead of a single domestic price, to which we had been accustomed for years, producers and smelters prices have differed as much as 8 to 10¢ per pound.

during this period. The foreign price has consistently been higher than our domestic market.

To meet our Country's needs for copper, the United States is dependent upon sizable tonnages from foreign sources. Since last August producers' prices have climbed from 36 to 46¢ per pound. We, as an independent fabricator, are only able to get a portion of our needs to meet your demands at producer prices. The rest, and it is a sizable proportion, has to be bought at premium prices.

Until March 20th our prices for sales of copper Bare, Weatherproof and Magnet Wire products were based on producer prices. On that date one of the large American producers of Chilean copper announced that their Chilean copper sold in the United States would be priced at London Metal Exchange prices. We have actually been buying copper in the last several months on eight different sets of terms and the American Metal Market in their editorial of April 3rd said ten different pricing methods are possible.

In an effort to get some recovery of our costs, we increased our base prices 3¢ a pound on March 20th. The effect of the Chilean contracts with Anaconda and Kennecott has brought the foreign price down approximately to the 50¢ level, but near term copper from other than producers is costing more than that figure.

Because of this downward price movement, effective today, we are reducing our base prices on copper Bare, Weatherproof and Magnet Wire to 47½¢ copper level, despite the fact that we feel there are still many variables in the method of buying copper.

We appreciate the many problems this changing market has presented to all of us and it is our hope that there will be less fluctuation and more stability in the future. We will do our best to continue to serve you with quality products at a fair price and we will try to keep you advised of significant changes in the market.

Yours very truly, Rome Cable Corporation,
F. S. Marks, Sales Manager.

FSM:hc

[fol. 5648] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 355

Rome Cable Corporation

1957 Sales Conference

J. H. Dyett—Materials, Money ... What They Mean to You

It's a pleasure to be talking to you on a subject that Dwight picked out, but last year he made me talk on "Confounding the Experts" which I found rather difficult. This year, as you will see from your program, it is "Materials, Money and What They Mean to You". Well, yesterday Ross said that this group owned one-third of the shares of the company. Well, that means that that subject means a great deal to most of you. Now if you have studied the Annual Reports you have seen that a year ago the materials cost $67\frac{1}{2}$ cents of the sales dollar and in the year just passed by April you show $61\frac{1}{2}$ cents. Now you can say, well materials don't cost as much anymore, but remember we have had increasing costs other places. Payrolls in the last four years have gone up 3 cents on the sales dollar and other services 2 cents, so we still have a very narrow spread when it comes down to the profit items. Even with the diversification which we have been attempting to get in Torrance and in Collegeville, we find that copper last year amounted to 42 cents of the sales dollar while steel was 5 cents, aluminum was slightly over 2 cents, Neoprene was nearly 2 cents and Polyethylene $1\frac{1}{2}$ cents. So keep that 42 cents in mind. It is so important that we can spend a great deal of time in studying the situation. The copper cost 10 times as much as the final profit to the company and at the current rate of profit we are realizing in the Rome plant it would be about 20 times, so those are very impressive figures. If we buy less copper and sell the same amount of goods, meaning that we get better turnover, naturally we are going to show better profits and since you are interested in profits it shows that you can be of great help to us.

Now, where are our inventories of copper? Probably driving down you saw hundreds of wirebars and you think,

—Good Lord, Rome Cable is really stocking up on copper. Well all that copper belongs to other people. It is here on toll. At the present time we operate on no wirebars. In fact, sometimes we go into the red but we always have copper in transit so we can replace that copper. Some day we are going to get back to the situation where we are going to have to have a stock of wirebars. In the old days we felt as though we needed at least a week. We didn't have all the toll copper. Situations seems to come back to us so some day we will have to provide money for a wirebar inventory. We have in scrap both here and at the refinery about 7 per cent of our total inventory. That is lower than it usually is, so with different situations perhaps that percentage would raise. In process we have 33 per cent. In Rome finished stock we have approximately 20 per cent. Now, that is at practically an all-time high of about 2,700,000 lbs. That means we can give you men in the field better service at the present time than I think has been our history in the past. Now in warehouse and consigned we have been averaging recently about 40 per cent of our total stock. So you add that 40 per cent to the 20 per cent odd in finished stock in Rome and it goes to make up a total of nearly two-thirds of our total inventory in finished stock in order to serve you and your customers. That is by far the largest segment of our inventory and you have that, to a certain extent, under your control. Now several of you men have had discussions with Dick Paole and myself on the subject of consignments, and I don't think since we've had them there has ever been a time that we in Rome haven't crabbed about them. After the meeting a year ago in June we were very disturbed here because we seemed to get no place so at my recommendation we hired Ernst & Ernst to make a study of the situation. I will not go into the details of that, but it was at considerable cost to us—in fact the study cost more than we earned in the Rome plant in the month of July. So you can see we are not talking about pennies. The main thing that they brought out was that the responsibility for the size of the consigned stock has to rest in the field. Therefore, all you gentlemen are responsible for that. We thought we had set up certain tools which would help you. Well those tools were not tools that you wanted, because

they were not used by the ones which we had given them to. We did not feel that everyone needed them because in certain areas they were getting good turnover. As a matter of policy here in Rome—and I hope I am speaking for every-[fol. 5649]one here—we don't care whether you get your turnover by Ouija board. The only thing is that we want to insist upon is that you get that turnover and you realize how important it is. If we cannot get the turnover we may have to insist that you try to follow the Ernst & Ernst system, or we discontinue consignments. I don't think we can go merrily along on this subject the way we have in years past. For instance, you may say, "Why get all upset about the consigned inventories?" Well, they value on a market basis about \$1,900,000; on book value about \$1,400,000. Now keep those figures in mind when you think of the additional loan we took out in August. We took out \$2,000,000 in additional funds, so a great percentage of that is invested in consigned stocks. And remember we took that out at an increase in interest rate. It is now $4\frac{3}{4}$ per cent, and we admit that is low in comparison with what some people are borrowing, but it still is something to conjure with. We continue to beg for your cooperation in this matter. We know it can be done because one territory year after year is able to get 4 times turnover, and I am sure in that territory they run into the same conditions of competition. Maybe one month it isn't as bad as maybe some other territory, but year in and year out they must face the same type of competition and we certainly have the same policy of selling there as we do in the other districts. If we can control this inventory situation it means we have dollars for other things. We have countless meetings in Rome trying to control inventories. But what has the total inventory picture been? In September of '55 we had \$5,200,000 in inventory, in May '56 we had \$7,800,000, on July 31st of this year we had \$8,900,000. In other words, it's been up 70 percent. And I think we all will agree that sales haven't been quite as good as they were in those other prior periods. Now, we believe we can use the tight money to much better advantage than to have the inventory in dead storage and I think you would be doing your customer a service by indicating to him that he doesn't need this inventory, that when he has it it costs him money. Even space costs money today.

Now, the warehouse stocks are in nowhere near as bad condition as the consigned, but even here we could have better control. In the first five months we averaged 300,000 lbs. more than in the first five months of last year, and our shipments out of warehouse averaged 200,000 lbs. less, so you can see we are getting considerably less turnover there than we did in the same period a year ago. Perhaps it is hard for you to see the connection with the risk we run on the inventory thing, but remember again nearly two-thirds of the inventory is in finished stock. We would like to have those finished stocks to service you but we would like to have them at economical levels.

How could you have helped Rome Cable and the Profit picture in the past year? On July 10, 1956—copper dropped 6 cents a pound, and it went from a total of 46 cents within a year to $29\frac{1}{2}$ and now, as you know, it is 27 cents, the producers price. Remember that during most of last year everybody said, "Well, there's a magic figure of 30—when copper hits 30, why that's about it." Well that isn't true. During a little over a year copper has dropped 19 cents a pound. That is a severe drop when you consider that during the last war copper was priced at 12 cents, during the Korean war it was $24\frac{1}{2}$ cents and in 1949 it was 16 cents. We have had a drop overall, when you consider the price of outside copper, of about 55 per cent. Now based on the average sale out of consignment for 1956 we had 750,000 lbs. a month. If we had had 4 times turnover we could have saved a quarter of a million dollars by postponing our purchase of copper for a year. That is impressive money and you could add to that if you consider the warehouse stocks.

To show what conditions we have been under this last year, copper has not held. For years we went along and we'd think copper would be pretty stable for quite a few months—even a year. It went to 40, then it held there for three months; it went to 36, lasted for three months; then it dropped to 34, one month. It was four months at 32 and [fol. 5650] one month at $29\frac{1}{4}$; one month at $28\frac{1}{2}$ and, as you know, now it is 27. We still feel, even although copper may seem fairly low, that we should confine our purchasing to what we absolutely need. We have taken, or you have taken, 600,000 lbs. out of our consigned stocks. That is a

good trend, but we should have at least 600,000 lbs. more out of those consigned stocks. A good many of you in discussions have said, "Well, we seem to be the only company that wants to control the consigned stocks." Freddie Marks told me that the other night he had discussions with some General Cable men at the Rome Club and that they are really putting on the heat on that subject. We have heard that Anaconda is very disturbed. We know that Simplex has cut down its inventories of bare wire, or are trying to, from six weeks to three weeks. We know what Westinghouse, what General Electric, what Allis-Chalmers have done in respect to inventories. This is just not a Rome Cable problem. Maybe some of the men out in the field that you meet from other companies don't realize the situation. Maybe it hasn't seeped through to them, but we feel as though it will eventually. Now, a large inventory—and this has been a matter of record in the newspapers—has kept many companies from continuing with their expansion plans because they just plain didn't have the money. That in turn affects our business. Also when we have our money tied up in high inventories we can't afford to give Charlie certain of the equipment which he might request, which in turn would mean more profits, better service, better profits to you. Now, when we have more material in the field we have to have less in Rome. Therefore, you begin to complain about deliveries from here, but remember we have to be controlled by certain things just the same way you do. If we find that we have to reduce our inventories to meet a necessary LIFO position at March 31st and you don't get your inventories down in the field, we can't do it in Rome. That disrupts our plant both at the time we are cutting down and at the time we are gearing up again, so perhaps even this year when we have plenty of copper if you don't do your job next February you will begin to get poorer service and that poorer service might continue through until June. So five months out of twelve you might be very seriously affected.

Copper, as you know, has been very shaky and you may very well ask the reasons for that. Now, I have had photostated an article from Business Week which I think covers it in very good shape and it will save you from listening to more from me. Among the things which they give as

reasons were the rising of refiners inventories, the production increases throughout the world, the lower deliveries to fabricators, poor consumers demand, and the unsteady influence of the London Metal Exchange. As you probably know, the London Metal Exchange has constantly for many months been considerably under the price in this country. Why do we look at that has been explained by one of the copper men as follows: "The United States sells at prices producers set, except for the 15 to 20 per cent of the custom smelter or outside copper, while the London Metal Exchange is the one great exchange, although the total copper that is moved there is relatively small, that follows the laws of supply and demand." But in addition to the reasons given in those articles I would like to list a few others. We have had an unusual period of labor peace in this country in copper. Chile is willing to sell at the London Metal Exchange which sank as low as 22 $\frac{3}{4}$ cents, although in 1954 they held 100,000 tons at the price of 30 cents over the market until the United States bailed them out. You will remember that, perhaps. And the Minister of Mines at that time said the country could not sell the copper at under that figure because it would ruin the economy. This Minister of Mines, although he announced recently a cut-back in production there of some small mines, said that Chile would have to continue the same production and they preferred to increase the production of Anaconda's and Kennecott's mine in Chile, even at present low prices. They have switched around on that from what they felt in 1954. The big producers in this country have been very slow to cut. The primary production for the first eight months of this year is slightly above the average for 1956. They have largely given lip service [fol. 5651] to cuts. The new production has more or less balanced the cutbacks. In the paper this week Phelps Dodge announced that they were going to cut an additional 5 per cent which means that those mines are only going to operate 22 days a month. Now that is hardly a very serious cut and we have yet to hear from Kennecott. Last month one of the big producers sold a considerable tonnage to Spain at a foreign low price. That same big producer has been actively soliciting throughout 1957 business from customers in Europe for electrolytic copper; a thing that that

company has never done in its history before. They have been highly successful in selling over there to these new customers but the price is based on the London Metal Exchange. Well, when that London Metal Exchange price gives that company, when you consider freight and all other costs, 4 cents or more or less than they are getting in the domestic field, it certainly gives the consumer a great deal of doubt as to what the low of the market is going to be in this country. If that company is willing to sell, say, at 23 cents return to them in Europe why are they not willing to sell at the same price in this country? Last month England had 27,000 tons which they announced they were going to sell in the open market. That has just been rescinded. Any consumer has known in the past months that they could get immediate deliveries so what was the sense of buying ahead, and we are still liquidating inventory here.

You all no doubt know what has been happening this last week in the copper market, but I don't think any of us should get disturbed either one way or the other about it. If you were disturbed you wouldn't know whether to smile or cry when you came into the office in the morning because what has happened is this. On the 9th of September the price of copper on the London Metal Exchange was the equivalent of 22-3/4 cents here. On the 12th, it went up to 23-7/8 cents. On the 13th, it went up to 25-1/2. In other words, it was up 13 per cent in four days. Now we were not stampeded into buying. It is true I bought a little bit at 25 cents here and I bought less at 25-1/2. Well, on the 16th—the next day—in London it went down to 24 cents. The next day it started going up a little again and now it is 25-1/2 cents. Now another thing we shouldn't do is to rely on the experts. I will read you what some experts said a year ago. In June, the 28th, 1956, Elliott Janeway wrote as follows (and just keep in mind the price of copper dropped 6 cents a pound on the 10th of July, or two weeks after this); "Copper prices will be vigorously strong over near to intermediate term as British and West European buying zooms following inventory cut-backs and if orders by automobile manufacturers come back in strength. Automobile industry will come back hard in 1957 model year and will not be caught again in squeeze of two-year model car. Any attack on the present domestic producers price of 46 cents a pound

puts pressure on Chile. Chile will probably withhold production if price drops below 46 cents. Outside copper market, London market and custom smelters will go over 50 cents a pound again in relatively short time." About the same time McGill Commodity Service made quite a different projection. "Briefly summarizing the three important facts to consider are these: First, will the demand for copper improve? Our answer is, not materially during the third quarter. In fact, demand will decline. Second, will production be cut back? The answer here is, yes, either through reduced overtime or by a strike. Third, will foreign copper be a stronger threat to the domestic price levels? The facts show the answer to be yes." Well, McGill hit it much more on the nose than Janeway, Lord knows, but even they were wrong on the matter of cut-backs and we are still waiting for cut-backs and here it is 15 months later. We shouldn't believe too much in newspaper headlines. For instance, on September 14th here's what a headline was: "London quotation soars". Well it dropped the next day. "Chile to reduce output by 35,000 tons". Well, at the same time in another newspaper it was quoted that the Minister of Mines was urging Kennicott and Anaconda to keep their production up or increase it. "Scrap up 1 cent." It was down on the next Monday, and on the next Tuesday. We believe in a situation such as this that our customers are going to be [fol. 5652] the weathervane as to what happens to the copper price. You can be of great help to us in letting us have information on that. Remember, there is a plethora of supply today, and it is only through a resumption of actually buying that this thing can be stabilized, in my opinion.

Now, how have we fared by staying close to shore and not buying any more copper than we had to. Well, so far this year we have made a very slight profit on copper which is in comparison to last year losing approximately 30 cents a share on our copper and 45 cents a share in the prior year, at a time when copper was going up, so it is a topsy-turvy thing. When copper goes up—a year and more ago we lost money—now it's going down we are making out all right. Now why are we making out all right? The situation can change, of course, because copper pricing is all over the map and it may go back to a former condition. But the

reasons are that we at the present time have several advantageous contracts and we have all our contracts—and that amounts to 50 per cent of our copper approximately—on an average price for the month. Now in the old days we used to have to buy firm weeks ahead. Now what we receive in the month of September, most of it is priced on the average for the month of September. Also we defer our purchasing as late as we possibly can. Our fabricator accounts are getting the benefit of our average at the present time which is running now at under the Engineering & Mining Journal average. They are not getting the benefit of the low customer smelter prices because we do not feel either for their sake or for our sake we can change our general pattern of purchasing, because if we go into the outside market and the customer smelter market exclusively and buy this 25, 25-1/2, 26 cent copper, we will at a time when copper becomes scarce again—and it always goes through these various periods—we will be sitting out on the street corner. Now what are the encouraging signs in copper? As far as Rome Cable is concerned our orders in here on warehouse and consigned are running so far this month under your sales. At least that was true for the first two weeks. Our rubber covered backlog is not slipping, it may be a little bit lower now, but it is not slipping from what it has been in spite of competition and no incentive to buy. Our rubber covered sales April through July were within a thousand pounds of our rubber covered sales for those same months last year. That shows that the rubber covered business has not flown out the window, as many people have indicated. If you include the August, for both years there were artificial circumstances in this month, it means that we had a decrease in the first five months of 6 per cent. Now on consigned, for five months our average was 693,000 lbs. one year and 687,000 lbs. the next year, so to all extents and purposes our consignment sales in the first five months are as large as they were a year ago.

The industry, and we must always keep in mind what Rudy said yesterday, that it was the dynamic electrical industry—it has its ups and downs, yes, but it's always going ahead on the long term. In 1956 it was estimated that copper production would come out at a cost of 25 cents or over on 360,000 tons, or one-third of the production. There-

fore, if you get the price too low those mines producing one-third will shut up if that price is maintained for very long. Now you can read in the paper that Kennecott can produce for 14 cents, and you will read in that article you have down there that some of Phelps Dodge mines can produce copper at 10 cents a pound, but what some of you may overlook is that emphasis that should be put on the word "some". You've got Chile producing an estimated 12 cents a pound, but never forget that the Chilean government charges a tax of 60 to 75 per cent on profits from there; so they are not going to want the price to get too low. Africa, production is estimated between 17 and 20 cents. Another encouraging thing is that a little flurry means buying. We found that out last week in custom smelter purchases.

[fol. 5653] The first reduction in world refined stocks since April occurred last month when it went down 6,000 tons to a total of 424,000 tons which we admit is large. World deliveries to fabricators, and remember that it's world deliveries, have been extremely good. In fact, in 1957 so far their daily average is at an all time high of 7846 tons a day compared with last year's average of 7740 and 1955 of 7519 tons. So the world is consuming more, or buying more. Now the decrease in the United States was approximately 10 per cent. We are also getting to a busy time of year. Standard & Poor's says that there are faint signs of improvement. I learned from a man just coming back from Detroit that the automobile people are not discouraged and are basing sales for this next year at an increase of about 3 per cent. Construction for the first half of this year was 5 per cent over the same period last year and there has been a sudden spurt in orders for the steel-type prefab house. Retail sales have been going up. People have money. We have had automatic wages increases at a time of full employment. The copper industry has for many months been behind the parade, so to speak. For instance, since April 1956 the net domestic consumption of copper has been below its historical relationship to the Federal Reserve Board index of production for seventeen months. Now in the 1953-54 slow down that was true for 15 months. In 1949, another period that wasn't so hot for us, five months. And remember that the Federal Reserve Board is running at an all time high for the past eleven months. So, in my opinion,

with a high economic level in this country we may be pulling out of this sooner than some of us realize, and the final thing is that people may if they study all these different signs begin to realize that the wire industry is one that persuades itself into recession and talks itself into low profits.

Now turning away from copper, aluminum, as you all know, has been in plenty. The aluminum companies evidently have a very funny idea as far as materials and money are concerned. They can increase their prices of the pig product and reduce their prices of the wire and cable products at the same time—go up a cent—down 3, 4 or 5 cents. We have a supply situation there. You've got imports that the U. S. companies have purchased entering into U. S. surplus deals. Certain copper is now going to be released from those so that the aluminum companies will sell it rather than deliver it to the government. You've got a new competitor coming in the form of Oremet at a time when there is plenty of aluminum. Now I would say that you will all agree that Stan Williams has given you your money's worth as far as buying materials for this company. We feel as though that department is very important. Jim McCann has certainly always given a very good account of himself and we have recently bolstered it by having Freddie Marks, Jr. go in there.

Traffic also costs you money. In 1951 we had a bill of \$1,200,000. Last year it went up over \$1,600,000, or an increase of one-third. This year we may be faced with more. We have had two increases in tariff rates and we may have another. It might go up to \$1,800,000. When you figure that with what our earnings were last year you can see how important traffic is. Frank McKevitt, who keeps a very close tab on all these things, had one request which was that you all take advantage of the lowest rates out of your warehouses by combining orders.

We get down to another place that we have had encouragement and that is in the Torrance consigned stock deal. As you all know, those have been discontinued and Ted Lewis deserves a whale of a lot of credit for his part in NEMA and in the persuasion of other companies to discontinue those stocks. We also should say that the Torrance boys have done a wonderful job as far as getting out very large shipments which produced good sales and good profits.

We admit we have one material and money problem out there, and that is at the present time we have very large stocks of raw steel. It totals about three months. In the case of raw steel though we did this on purpose in order [fol. 5654] to get steel in before the price increase, but we are very conscious of the money invested there and Torrence, I am sure, is going to do everything to bring that inventory down within a very few months to 1½ months.

We have not had a chance to discuss many inventory problems at Cope but I am sure that the new members of the family at Cope, whom we are very happy to have with us, will agree that if they are going to get certain equipment needs there, we have to provide money for them and we can provide money in controlling inventory.

* In closing I would like to read what Republic Steel put out in a very fine booklet as to their policy. It said, "Republic Steel feels obligated to be a cooperative customer, a reasonable customer, it wants no special favors, no bargains that will cost a supplier to lose money. Republic believes that when other companies make money and grow, it too will make money and grow." Now the only thing I want to leave with you—Why the Hell don't we sell Republic or somebody else like them?

Thank you.

[fol. 5655] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 356

Potential Uses of Aluminum in Insulated Wires & Cables

In order to give a carefully reviewed summary as to the potential uses of aluminum as a conductor in various types of insulated wire and cable the question of economics cannot be ignored and in many cases it may well be the deciding factor. If we consider only the suitability of aluminum from a technical basis we get a decidedly different picture.

For the past three years one of the integrated aluminum producers has been conducting an extensive drive to get aluminum used in many applications. The prices quoted have been in most instances very unrealistic and it is hard

to believe that they would continue to do this for an indefinite period of time.

If we make this analysis at the present time we have no choice except to consider the prices currently being quoted for the aluminum conductor and compare it with the competing copper product. Please keep in mind that I am not referring to special competitive prices that are prevalent in both copper and aluminum wire but to the published prices [fol. 5656] for the respective products.

There is a second factor which is exceedingly important in this type of comparison. We must make some assumption as to the size of conductor which is to be used when aluminum is being compared to copper. For purposes of this study we are assuming that the aluminum conductor is being supplied with the same resistance as the copper conductor.

With the above assumptions as a premise we can now give a general outline of the various types of wire and cable which can be technically and economically justified with aluminum conductor.

I. We are starting with the accepted fact that aluminum conductors both bare and covered is decidedly superior to copper in most instances for overhead transmission and distribution purposes.

II. Magnet Wire. It is doubtful if aluminum will prove to [fol. 5657] be generally suitable or economical in film coated magnet wire.

Aluminum has proven to be technically suitable in fibrous covered magnet wire in the square and rectangular sizes for use in dry core transformers but it has not proven to be economical. These studies were made at a time when copper was selling at prices in the neighborhood of 40¢ per pound. With current price of 29¢ for copper this would make a considerable difference in favor of copper.

III. Flexible cords and cables. It is doubtful if aluminum will prove suitable from a technical standpoint for products subjected to frequent or constant flexing. It is being used by one manufacturer for welding cable but has not gained general acceptance.

IV. Telephone Cable.

- a) paper insulated.
- b) plastic insulated.

Aluminum has proven suitable for paper insulated cable and would be equally suitable for the plastic insulated cable. The question here is largely a determination [fol. 5658] of conductor size that would be required. If the aluminum conductor may be of the same size as the copper conductor for use in telephone work it would prove to be economical; but if a larger size would be required it is doubtful if any economy would result.

V. Construction Materials.

We usually consider five different wire and cable products as being in the class of construction materials. We will treat each of these as separate items.

- a) Building Wire (Braided)—Rubber Insulation Aluminum has proven to be suitable and economical for the type of wire in sizes #6 AWG and larger. We question either its suitability or economy in the size smaller than #6.

- b) Building Wire—Thermoplastic. (Type TW)
Same as Rubber type.

- [fol. 5659] c) Service Entrance Cable.

Aluminum conductor has already proven itself for this class of cable.

- d) Non Metallic Sheath Cable.

It is doubtful that aluminum will prove suitable in this type of cable.

- e) Rubber-Neoprene Building Wire.
Same as Rubber Insulated (Braided)

VI. Electronic Wires & Cables.

It is doubtful if aluminum will prove either suitable or economical for these products. They usually involve small size conductors and in many cases are stranded from small sizes of wire.

VII. Power Cable.

In the general category of power cables either for overhead or underground use aluminum has proven to be a

suitable conductor and fairly sizeable quantities have been used with entire success.

[fol. 5660] The economics of the various types and voltages is pretty difficult to cover except by reviewing a whole series of voltages and various types of insulation such as rubber, paper and varnished cambric.

I think a general statement can be made that in most cases for voltages of 5000 and less that aluminum will be found to be economical. For voltages over 5000 it is necessary to analyze each particular situation and study the type of construction, insulation, duct space, etc.

[fol. 5661] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 357

January 12, 1959.

Potential Uses of Aluminum in Insulated Wires & Cables

I have reviewed the report which I prepared for you approximately one year ago and have made certain changes that reflect developments which have taken place during the past year.

I. General.

It would appear that the integrated producer referred to in the previous report (Kaiser) has decided to continue the unrealistic prices which were previously used because they have now published price lists which will be referred to in appropriate sections of this report.

Another development which is about to take place is that they are bringing out new conductor tables involving special sizes of conductor that are smaller in cross section than is required to give equal conductor resistance.

[fol. 5662] II. We are starting with the assumption which is already accepted that aluminum conductor (or ACSR) either bare or covered is superior to copper in most instances for overhead transmission or distribution purposes.

III. Magnet Wire.

Our previous summary expressed the feeling that aluminum would not become much of a factor in magnet wire. This previous statement was based on a careful analysis of costs of manufacture. During the past year there have been two public announcements and published prices which might change this picture.

- a) The Aluminum Co. has made arrangements with the Rea Magnet Wire Co. to produce film coated aluminum wire in sizes 17 to 24 AWG. We do not produce this type of wire but I am told that the prices are not realistic in relation to costs.
- b) Kaiser has published prices on square and rectangular aluminum conductor with paper covering and glass coverings. These prices are from 35 to 40¢ per pound under our prices. If they are prepared to furnish a satisfactory product at these [fol. 5663] prices it will materially affect the thinking of the transformer manufacturers.

Another interesting development of the past year is the announcement of the General Electric Co. that they have produced a 25000 KVA high voltage power transformer using aluminum foil winding and Maloney has produced a distribution transformer also using an aluminum foil winding. The successful performance of these two pieces of equipment may materially affect the use of copper in transformers.

IV. Flexible cords and cables. We have not seen any further developments of fine sizes of aluminum wire being used in cords or cables subject to frequent or constant flexing. It is doubtful if this will prove to be a market for aluminum wire of any consequence.

V. Telephone Cable.

- a) Paper insulated.
- b) Plastic insulated.

[fol. 5664] Aluminum has proven suitable for paper insulated cable and would be equally suitable for the plastic insulated cable. The question here is largely a determination of conductor size that would be required. If the alumi-

num conductor may be of the same size as the copper conductor for use on telephone work it would prove to be economical, but if a larger size is required it is doubtful if any economy would result.

The A.T.&T. and Western Electric Co. have made comprehensive studies on this subject and with copper priced in the range of 29 to 30¢ per pound it is doubtful that aluminum will be used to any great extent.

VI. Construction Materials.

The following sections give direct comparison of costs of various wire and cable products. These figures show the direct savings which result in aluminum conductor.

Two points should be kept in mind in analyzing these figures.

We believe that the copper prices for 600 volt RR [fol. 5665] and TW are depressed due to competitive conditions and are basically lower than they should be when related to costs. On the other hand we also feel that the published prices of Kaiser are unrealistic with relation to cost.

In order to make a direct comparison of the various classes of products in the construction material field we have selected certain sizes of copper and aluminum conductor and indicated the current prices for the two different products.

In it is important to note that we have selected the appropriate size of aluminum conductor to give equal conductor resistance whereas the new plan of Kaiser would indicate a smaller size thereby showing a still more favorable price comparison for aluminum.

1—Building Wire—Type TW

We believe that this class of product in sizes smaller than #6 AWG with aluminum conductor will not prove either popular or economical consequently our comparisons are based on sizes larger than #6 AWG.

[fol. 5666]

		Type TW			
		Copper	Alum.		
#	6AWG	56.77	#	4AWG	37.39
	4 "	82.84		2 "	54.94
	1/0 "	186.20		3/0 "	126.16
	4/0 "	337.44		350MCM	267.52
	500MCM	766.84		750MCM	503.88

2—Service Entrance Cable—Type SE—Style U
Comparison of the popular sizes of copper and aluminum are shown below:

Copper		Alum.	
\$ 6/3 cond.	207.48	4/3 cond.	162.64
3/3 cond.	345.80	\$ 2/3 cond.	209.00
1/0/3 cond.	816.24	2/0/3 cond.	359.48

3—Non Metallic Sheathed Cable.

It is doubtful if aluminum will prove either acceptable or economical in this class of product.

4—Rubber-Neoprene—600 Volt Type RR

Note comparison of prices of copper and aluminum shown below. We feel that the aluminum prices are particularly unrealistic in relation to cost.

[fol. 5667]

Copper		Alum.	
\$ 6—	90.44	\$ 4—	59.81
4—	119.32	2—	79.80
1/0—	235.60	3/0—	161.12
4/0—	429.40	350M	358.72
500MCM—	948.48	750M	627.00

VII. Electronic Wires & Cables

It is doubtful if aluminum will prove either suitable or economical for those products. Some work is being done to produce an aluminum conductor with a thin copper coating but this has not progressed to the point where it can be properly evaluated at this time.

VIII. Power Cable (Rubber and thermosplastic insulated)

Aluminum has been found to be a suitable conductor for these applications and the following comparisons show the economies which can be effected by the use of aluminum conductor.

I wish to point out that in the case of the power cable that we feel that prices for copper cable are realistic in relation to cost whereas the aluminum prices (Kaiser) are completely unrealistic.

[fol. 5668]

5KV-Shielded Power Cable				15KV-Sh.-Grounded			
Copper		Alum.		Copper		Alum.	
\$ 6	475.95	\$ 4	366.70	\$ 1/0	1508.60	3/0	1166.00
1/0	921.50	3/0	712.50	4/0	1862.00	350M	1564.00
4/0	1280.60	350	1133.35	500M	2951.00	750M	2292.00
500	2318.00	750	1800.25				

IX. Control Cable

We doubt if aluminum will prove suitable or economical for control cable because they are usually made from small sizes of wire going into stranded conductor.

[fol. 5669] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 359

CC: D. H. THAYER

To: G. E. Rolston
From: J. R. Woods
Date: May 11, 1959
Subject: Aluminum

Dear Glenn:

The purpose of this memo is to express some thoughts and observations on the insulated aluminum market. It is hoped that this information will serve as a basis for evolving sales policies which will promote the use of aluminum and assure Rome Cable a dominant position in the insulated aluminum field.

It is the opinion of the writer that aluminum will eventually gain acceptance as an insulated conductor and entirely supplant copper for many applications. There has been a natural reluctance on the part of contractors and journeymen to accept aluminum because of lack of availability and connector problems, most of which are imaginary. While the trend has been slow, it is growing as evidenced by almost universal acceptance of aluminum SE and aluminum building wire on so-called "monumental jobs". It is recalled that aluminum secondaries became popular almost overnight in spite of violent objections on the part of many utility engineers. These engineers used the same arguments, connector trouble and not available. Aluminum for this application was initially accepted as a matter of necessity, but its acceptance was sustained by cost savings and satisfactory performance of the light metal. It is felt

that a similar, if not so spectacular, transition in the insulated wire field is eminent and will be precipitated by the volatile price and uncertain supply of copper. Once this change starts, the inertia will be in the opposite direction and the market will grow firm in favor of aluminum.

We have a very substantial interest and investment in the copper wire business. It is difficult not to instinctively protect this market. On the other hand we have an overriding obligation to Alcoa to do everything possible to promote the sale of aluminum. It is an unfortunate choice to make but it seems that the only kind of choices the wire industry ever presents are unfortunate. We should certainly make every effort to protect our copper business but it is likely that much of it will be lost by attrition. Aluminum, on the other hand, is growing. If we enter the aluminum field aggressively we can exert a great deal of influence and emerge as the leader in the insulated aluminum conductor market. Profitless aluminum prices discourage active participation in this market but we cannot afford to let Kaiser make us an also ran in the transition to aluminum. Any plans we make will be greatly influenced by our competitors' principles and policies, so I have attempted to analyze them in an effort to forecast their marketing programs. The conclusions I have drawn are based on past competitive practices, informal conversations, and to a great extent conjecture.

Reynolds—Although they are second only to Alcoa in the primary production of aluminum, they have not been very successful in the sale of aluminum conductors. Their sale of overhead conductors may be substantial but their over-[fol. 5670] all market position is weak. Their limited success is based partly on the REA agreements which have hurt them with utilities and partly on cut prices that utilities could not resist. They do not have production facilities for other than bare and covered conductor and in spite of rumors to the contrary, I am led to believe that they do not plan on entering the insulated conductor field in the near future. They do not have a field sales force capable of promoting insulated aluminum conductors nor do they have distributor relationships essential to marketing this product. I am told by their manager of electrical markets sales that Reynolds management cannot justify entering the insu-

lated conductor market unless they can show a profit. This is, in their opinion, impossible in view of published prices. It would be dangerous to assume that they will not change their minds and purchase a going concern particularly if some of the independents find it expedient to sell at a bargain price in face of the depressed copper prices and impossible aluminum prices. For the time being Reynolds feels that they can best serve the interests of aluminum by educational promotion and then supporting independent fabricators by establishing sales policies and prices that will enable a fabricator to process aluminum at the same profit margins as he has had on copper. While this philosophy is admirable, it has little chance of success. Either rods would have to be reduced to a price below pig or the price of the insulated aluminum would have to be adjusted to reflect the true inherent savings in the light metal. The first is impossible and Kaiser shows no inclination to recognize the second. Reynolds must be considered as having little influence unless they purchase a going concern in which case they will have decided to compete with Kaiser and will have to be evaluated accordingly.

Kaiser Aluminum & Chemical Sales—Trying to rationalize this competitor's behavior is one of my favorite and most fruitless pastimes. They must certainly be conscious of profits but everything they do seems to refute this. I am reduced to measuring their success in terms of market acceptance and on this score they have shown outstanding results. They have an imaginative and aggressive sales department, backed up by a competent engineering staff and outstanding sales promotion people. They are in short a tough competitor. They attained their stature in the overhead conductor field with a combination of cut prices and good salesmanship. They have now assumed leadership in this field and are exercising that leadership to enforce price stability that should make the copper industry envious. While this stability is not at a desirable price level, it is nonetheless a significant accomplishment.

Their present unrealistic pricing policies on insulated aluminum can only be justified on the assumption that they plan to overcome resistance to aluminum at the expense of immediate profits in anticipation of creating a market [fol. 5671] at which they will be a dominant factor and then

adopting realistic price structures. The fallacy we see in this approach is, of course, the fact that the non-integrated producers cannot compete and therefore, will do everything possible to retard the trend to aluminum. Kaiser must realize that their production capability cannot support a mass conversion to aluminum and they must have the co-operation of other producers, particularly in the building wire field. This analysis is based on irrefutable economic facts and should prove that Kaiser is following a path that leads up a dead end street. However, I have too much respect for their merchandising capability to think they have not carefully considered all the angles and decided upon this approach as the only sure way of promoting aluminum in insulated products. Has Kaiser discounted the argument that the independent fabricator will resist the trend to aluminum at promotional prices. Have they reasoned that an independent will produce anything at any price as long as there is a demand for it in the market place and concentrated their efforts on creating that demand. A review of their successful promotion of covered line wire and triplex would give them ample precedent to justify this course of action.

Ten years ago we and the industry would have justifiably argued for a copper substitution method of pricing aluminum covered and triplex and our assumption that the industry would not contribute to the promotion of aluminum at ruinous prices would have been just as valid as the same arguments for a similar procedure on insulated aluminum are today. As valid as these arguments were and are, the fact remains that a demand was created in the market and the wire industry couldn't resist filling that demand. Witness the fact that today we are falling all over each other to manufacture aluminum line wire and triplex at 50 to 60 percent of prices we should get on a copper substitution method. Is it not reasonable to assume that Kaiser is following a sales tack that has already proved effective. I suggest the following as their marketing strategy on insulated aluminum conductors.

1. Establish promotional prices that are so low in relation to copper that they must be considered, especially on large building jobs.

2. Concentrate on so-called monumental jobs with little concern for the fact that aluminum is not generally available from wholesaler's stock. This has two desirable effects—

- (a) it gives the builder and contractor a taste of the economies (even though they are false) of aluminum.
- [fol. 5672] (b) it trains journeymen in the use of aluminum and dispells their fear of termination problems.

3. Builders and contractors having used aluminum successfully and economically on a monumental job, take a close look at in on their next job. It takes only one contractor getting one job based on the economies of aluminum to make his competitors acutely aware of the necessity of competing on an equal basis. On the next job all the contractors will be looking for aluminum prices. This builds back pressure on the manufacturer through the distributors to manufacture aluminum at competitive prices. There is ample evidence that the wire industry will do anything to stay in business and keep their distributors. It seems logical for Kaiser to assume that the industry will adopt a "you can't do that to me" attitude and satisfy the distributors' demand for insulated aluminum even at a loss. The actions of G. E., Paronite and Narragansett would certainly reassure Kaiser that the rest of the industry would fall in line.

4. Wholesalers' stocking of aluminum is the next logical step. While non-integrated manufacturers might reluctantly go along at a loss on jobs, the figures I see would not permit them to maintain stocks for more than a short time. Having established partial acceptance of aluminum and built up a demand in the market place, is Kaiser's next step to sweeten the price a little to encourage manufacturers to enter the field with both feet. If independent manufacturers will nibble at the market at current prices, wouldn't they go after it aggressively with another 10 to 15 percent on the price. The very low price of aluminum is only necessary to overcome inertia. When the demand is created they can move up a little closer to copper and still capture the market.

Much of the above is, of course, conjecture but many of the elements of such a plan have already fallen into place.

Based upon what has taken place and reviewing their successful tactics in promoting line wire and triplex, it seems reasonable to extrapolate such a policy.

Southern Electrical—This is the only other integrated fabricator of aluminum insulated conductor. They do not have established distributors or an effective sales force and their production capacity is quite limited. Their activity in insulated aluminum is too limited to evaluate. They will certainly be looking for a place to sell metal and building wire presents a perfect opportunity. I would expect to see them actively in the insulated aluminum conductor field, particularly building wire.

Kennecott—They are worthy of mention in view of their 13 percent interest in Kaiser and their announced eagerness to increase their holdings. They are primarily committed to the copper industry and unless their stock certificates get them a discount on aluminum, they have no reason to promote aluminum conductor. It would appear that the only influence they would have on the market would be to protect their interest in Kaiser and the copper industry by encouraging realistic aluminum pricing. If Kaiser's sales policies produce sales and profit, it is doubtful that Kennecott's council would be heeded.

Anaconda Wire & Cable—While not a primary producer, they are considered to be one because not everyone in the trade is aware of their corporate structure. Most people consider them a 60,000 ton producer of aluminum and they billed themselves as a prime producer when seeking utility business. Anaconda has always jealously guarded their enviable position with distributors and will have a hard time resisting pressure to furnish aluminum at competitive prices. It is my opinion that they will lose about two distributors to Kaiser before they go after their share of the insulated aluminum market.

All other factors in the insulated wire business, not specifically mentioned above, have no interest in the sale of metal but are only interested in insulating at a profit. If insulated aluminum takes over a substantial part of the market they cannot continue to exist on a shrinking copper market which is already plagued with over production. They will be confronted with the dilemma of closing down or selling aluminum. When faced with this choice in copper,

they have continued to operate even at a loss. There is no reason to believe that the color of the metal will change their habits.

No treatment of this subject is complete without a look at the Kaiser organization which as previously mentioned is very effective. I get the impression from personal competition with them in the field and conversations with their sales management people that they think they are ordained to lead the wire industry to aluminum on their terms. They have elevated some very young men to responsible sales positions and although they may be brash and misguided, they have extremely high morale and consequently they are effective in building sales volume. They are imbued with the idea that aluminum is the best conductor for all applications. They have absolutely no respect for copper wire pricing methods, in fact the best reason they offer for not adhering to copper methods is because it is a copper method. As unpalatable as this may be to the wire industry, it does enhance their reputation with the consumer who, after all, they are trying to sell. Their attitude can best be illustrated by relating a conversation I recently had with their manager of magnet wire sales, a young man who has spent two years in the wire industry. He told me that they [fol. 5674] were very pleased with the price structure of aluminum magnet wire and implied that they were satisfied with the profits they were showing on this product. He justified the lower price by saying that the metal was cheaper, copper wire prices were unjustifiably high, and aluminum permitted higher running speeds. He even thought that the covering speeds on fibrous covered aluminum magnet wire would be faster. I talked him out of this but he still claimed that there were economies in running aluminum film coating and these economies were reflected in the selling price. While there might be some obscure savings in film coating aluminum, I am certain that they do not justify the difference in price and even a cursory analysis of the two prices would prove this. While these arguments can be shot full of holes the fact remains that they have a telling impact on the customer. They have backed up their pricing and selling of magnet wire with descriptive data that the copper industry could have published 20 years ago, but didn't. Their booklet on aluminum magnet

wire is one of the most informative and imaginative presentations I have ever seen. This combination is hard to beat. They thrive on the copper industry's attitude of "don't do anything to disturb the status quo" and counter with "let's do something, even if it's wrong". Our plans to compete with them must certainly reckon with these characteristics.

I would like to recommend a sales policy that would encourage our competitors to actively promote or at least passively accept a transition to aluminum. Such a policy would consist of realistic prices for rods and the finished product, leaving room in between for a fair fabricator profit. This approach would take longer but it would be far less destructive than the Kaiser policy which borders on ruthlessness. Under this policy aluminum would gain on its own merits and everyone would be selling. Unfortunately, Kaiser does not concur with this thinking and unless fabricator pressure, poor operating statements and/or Kennecott's influence can change their philosophy, we have no choice but to beat them at their own game.

If my analysis of Kaisers' sales technique is substantially correct and if the effect is as predicted, they will not only lead the way to aluminum conversion but in the process will become the leading producer of insulated aluminum conductor. We will certainly be expected to encourage the transition but I do not feel that we should resign ourselves to a secondary role in market stature. We have many things in our favor, including the Alcoa-Rome name, size and know how. We can take the lead from Kaiser if the necessary decisions and plans are made now.

Very truly yours, Jack

JRW:reh

6

[fol. 5675]

IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 360

January 18, 1961

A. D. R. Fraser
Rome
Mr. L. E. Hickman
Pittsburgh

As you know last week because Bob Williamson was in Pittsburgh, and after checking with your secretary, I asked him to attend the Economics Coordinating Committee meeting, which he very much enjoyed.

When he got back he gave me the statistical data which he received, which included the Economics Coordinating Committee forecast. Under EC Wire & Cable the figures are somewhat at variance from the budget which the Rome Division put together covering aluminum content of wire and cable. Not knowing the person or department who compiled the data I am sending two copies of this letter to you.

The total figures for EC Wire & Cable at 70,000,000 pounds closely approximates our budget on Bare and AC-SR for the year which was, 67,600,000 pounds. We have budgeted a total of 11,500,000 pounds of covered wire which brings the total included under that group to 79,100,000.

Accessories are approximately the same. We had 2,500,000 pounds vs 2,400,000 on the Committee report. I do not know where aluminum conduit and bus are included, but we had 15,000,000 pounds for conduit and 1,400,000 pounds for bus, bringing the Division total to 98,000,000 pounds.

I am attaching two copies of the break-down of this budget by quarters. If you feel it advisable to pass one along. We have not given you anything on our copper or steel data on this compilation as it would not be revelent or desirable to combine them.

A. D. R. Fraser

2494

[fol. 5676]

1961 Rome Division (Except Cope) Quarterly Budget By Class of Product

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total
Bare & ACSR	16,700	18,500	17,000	15,400	67,600
Covd. Wire	2,500	2,600	3,400	3,000	11,500
	19,200	21,100	20,400	18,400	79,100
Accessories	600	600	700	600	2,500
Conduit	3,100	3,900	4,300	3,700	15,000
Bus	300	300	400	400	1,400
Total	23,200	25,900	25,800	23,100	98,000

[fol. 5677] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 363

A. D. B. Fraser

September 3, 1957 *WEL*

J. R. Woods

PRICING
Copper Vs. Aluminum

cc: G. E. Rolston

The following information is submitted per Glenn's request of August 30th.

Column 1: Current list prices of Aluminum constructions shown.

Column 2: List prices required to yield the same net return for covering Aluminum conductors that we receive for covering the same construction in Copper.

Product Description	List Prices Dollars per Mft.		
	Column 1	Column 2	Column 3
#4 Strand Polyethylene Triplex	\$127.00	\$124.89	\$103.50
#2 Strand Polyethylene Triplex	171.00	165.00	139.50
#4 Strand RoPreme Triplex	138.00	135.96	112.50
#2 Strand RoPreme Triplex	181.00	174.04	147.60
#4 Polyethylene Line Wire	42.50	40.51	34.65
#1/0 " " "	85.00	100.83	69.30
#4/0 " " "	168.00	169.79	136.80
#4 RoPreme Line Wire	43.00	40.35	35.10
#1/0 " " "	86.00	100.60	70.20
#4/0 " " "	170.00	169.36	138.60

The above calculations do not take freight into consideration. In the case of triplex which is sold F.O.B. Mill with freight allowed, we would gain slightly because of the lighter weight of Aluminum. On Weatherproof, we would gain slightly on Copper by picking up Hawkins Freight.

Column 3: Indicating today's competitive net price level added at your request.

[fol. 5678]

CONDUCTOR & CONDUIT COST

Copper Vs. Aluminum
on
Equal-Conductive Basis
3/C in Conduit (RH-RW)

FIGURES IN PENCIL
ARE BASED ON
CONDUCTOR SUBSTITUTION
METHOD. (28.5 Copper
26.5 Al.)

Conductor Size	Conductor Cost (3/C) MFT	Rigid Conduit Size 3/C	Conduit Cost MFT	Total Cost
98 Cu.	\$ 189.90	3/4	\$ 206.90	\$ 396.80
96 Al.	192.00 247.62	1	296.30	488.90
				544.52
96 Cu.	309.00	1	296.90	605.90
94 Al.	237.00 247.81	1-1/4	388.00	625.00
				736.81
94 Cu.	447.00	1-1/4	388.00	835.00
92 Al.	309.00 470.58	1-1/4	388.00	697.00
				859.58
92 Cu.	549.00	1-1/4	388.00	937.00
91 Al.	444.00 681.90	1-1/2	463.00	907.00
				1144.90
92 Cu.	624.00	1-1/4	388.00	1,012.00
91/0 Al.	525.00 837.70	2	618.60	1,143.60
				1,758.30
91 Cu.	855.00	1-1/2	463.00	1,318.00
92/0 Al.	633.00 768.13	2	618.60	1,251.60
				1586.73
91/0 Cu.	1,099.00	2	618.60	1,677.60
93/0 Al.	750.00 1146.15	2	618.60	1,368.60
				1764.75
92/0 Cu.	1,254.00	2	618.60	1,872.60
94/0 Al.	879.00 1564.83	2-1/2	960.30	1,839.30
				2465.13
93/0 Cu.	1,512.00	2	618.60	2,130.60
950,000 Al.	1,317.00 2154.90	2-1/2	960.30	2,277.30
				3115.20
94/0 Cu.	1,977.00	2-1/2	960.30	2,937.30
950,000 Al.	1,473.00 2406.81	3	1,256.20	2,729.20
				3663.01
9250,000 Cu.	2,487.00	2-1/2	960.30	3,447.30
9400,000 Al.	1,611.00 2486.17	3	1,256.20	2,867.20
				3942.32
9300,000 Cu.	2,899.00	2-1/2	960.30	3,819.30
9500,000 Al.	1,890.00 3323.373	3	1,256.20	3,146.20
				4577.57
9350,000 Cu.	3,216.00	3	1,256.20	4,472.20
9600,000 Al.	2,220.00 4206.773-1/2	3-1/2	1,636.10	3,863.10
				4428.58
9400,000 Cu.	3,621.00	3	1,256.20	4,877.20
9650,000 Al.	2,403.00	3-1/2	1,636.10	4,039.10

[fol. 5679]

**Conductor & Conduit Cost
Copper Vs. Aluminum**

**on
Equal Conductive Basis
3/C in Conduit (RM-RV)**

Continued - page two.

Conductor Size	Conductor Cost (3/C) MFT	Rigid Conduit Size 3/C	Conduit Cost MFT	Total Cost
#500,000 Cu.	\$ 4,491.00	3	\$ 1,256.20	\$ 5,747.20
#500,000 Al.	2,874.00 <i>5255.16</i>	4	1,936.60	4,810.60
				<i>7171.76</i>
#400,000 Cu.	5,610.00	3-1/2	1,636.10	7,246.10
#1,000,000 Al.	3,447.00 <i>6501.42</i>	4	1,936.60	5,383.60
				<i>8438.02</i>
#700,000 Cu.	6,315.00	3-1/2	1,636.10	7,951.10
#1,200,000 Al.	4,170.00	5	3,043.00	7,213.00
#600,000 Cu.	7,125.00	4	1,936.60	9,061.60
#1,300,000 Al.	4,560.00	5	3,043.00	7,603.00
#900,000 Cu.	7,923.00	4	1,936.60	9,859.60
#1,500,000 Al.	5,199.00	5	3,043.00	8,242.00
#1,000,000 Cu.	8,839.00	4	1,936.60	10,775.60
#1,600,000 Al.	5,430.00	5	3,043.00	8,473.00

NOTE: Based on Contractor's cost in effect August 2, 1957.

*Aluminum - Kase List 8/1/57
Cops. - Preslist REC - 7/6/57*

[fol. 5680]

CONDUCTOR & CONDUIT COST

Copper Vs. Aluminum
on
Equal Conductive Basis
3/C in Conduit (RH-RW)

Conductor Size	Conductor Cost (3/C) MFT	Rigid Conduit Size 3/C	Conduit Cost MFT	Total Cost M-FT
#8 Cu.	\$ 189.90	3/4	\$ 206.90	\$ 396.80
#6 Al.	192.00	1	296.90	488.90
#6 Cu.	309.00	1	296.90	605.90
#4 Al.	237.00	1-1/4	388.00	625.00
#4 Cu.	447.00	1-1/4	388.00	835.00
#2 Al.	309.00	1-1/4	388.00	697.00
#3 Cu.	549.00	1-1/4	388.00	937.00
#1 Al.	444.00	1-1/2	463.00	907.00
#2 Cu.	624.00	1-1/4	388.00	1,012.00
#1/0 Al.	525.00	2	618.60	1,143.60
#1 Cu.	855.00	1-1/2	463.00	1,318.00
#2/0 Al.	633.00	2	618.60	1,251.60
#1/0 Cu.	1,059.00	2	618.60	1,677.60
#3/0 Al.	750.00	2	618.60	1,368.60
#2/0 Cu.	1,254.00	2	618.60	1,872.60
#4/0 Al.	879.00	2-1/2	960.30	1,839.30
#3/0 Cu.	1,512.00	2	618.60	2,130.60
#300,000 Al.	1,317.00	2-1/2	960.30	2,277.30
#4/0 Cu.	1,977.00	2-1/2	960.30	2,937.30
#350,000 Al.	1,473.00	3	1,256.20	2,729.20
#250,000 Cu.	2,487.00	2-1/2	960.30	3,447.30
#400,000 Al.	1,611.00	3	1,256.20	2,867.20
#300,000 Cu.	2,859.00	2-1/2	960.30	3,819.30
#500,000 Al.	1,890.00	3	1,256.20	3,146.20
#350,000 Cu.	3,216.00	3	1,256.20	4,472.20
#500,000 Al.	2,229.00	3-1/2	1,636.10	3,865.10
#400,000 Cu.	3,621.00	3	1,256.20	4,877.20
#500,000 Al.	2,403.00	3-1/2	1,636.10	4,039.10

[fol. 5681]

Conductor & Conduit Cost
Copper Vs. Aluminum

on
 Equal Conductive Basis
 3/C in Conduit (RH-RW)

Continued - page two.

Conductor Size	Conductor Cost (3/C) MFT	Rigid Conduit Size 3/C	Conduit Cost MFT	Total Cost M-FT
#500,000 Cu.	\$ 4,491.00	3	\$ 1,256.20	\$ 5,747.20
#800,000 Al.	2,874.00	4	1,936.60	4,810.60
#600,000 Cu.	5,610.00	3-1/2	1,636.10	7,246.10
#1,000,000 Al.	3,447.00	4	1,936.60	5,383.60
#700,000 Cu.	6,315.00	3-1/2	1,636.10	7,951.10
#1,200,000 Al.	4,170.00	5	3,043.00	7,213.00
#800,000 Cu.	7,125.00	4	1,936.60	9,061.60
#1,300,000 Al.	4,560.00	5	3,043.00	7,603.00
#900,000 Cu.	7,923.00	4	1,936.60	9,859.60
#1,500,000 Al.	5,199.00	5	3,043.00	8,242.00
#1,000,000 Cu.	8,859.00	4	1,936.60	10,795.60
#1,600,000 Al.	5,430.00	5	3,043.00	8,473.00

NOTE: Based on Contractor's cost in effect August 2, 1957.

[fol. 5682] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 364

May 27, 1958

Mr. H. J. Zeck, Purchasing Agent,
Allis-Chalmers Manufacturing Company,
Columbus and Preble Avenues
Pittsburgh 33, Pennsylvania
Attention: Mr. P. A. Mihm

Aluminum Magnet Wire

Dear Sir:

We are pleased to outline the method used in pricing Aluminum Magnet Wire in line with your recent request. The price of the proper size and type copper magnet wire should be taken from the regular price sheet then the copper base is deducted, the resultant figure is multiplied by 3.3 and the present aluminum base is added to this figure which will give you the total price.

For example—100 x 350 Aluminum 1 Paper $\frac{3}{4}$ Lap	
Similar material in copper.....	50.29
Less copper base.....	-25.00
	<hr/> 25.29
Multiply for aluminum.....	3.3
	<hr/> 83.45
Plus aluminum base.....	24.50
	<hr/> 107.95 lb.

The 3.3 multiplier is used inasmuch as this represents the difference in weight between copper and aluminum. In other words, there would be approximately 3.3 times as much footage in 1000 lbs. aluminum magnet wire as there would be in 1000 lbs. copper magnet wire.

We trust that this is the desired information and will enable you to complete your estimating.

Very truly yours,
Rome Cable Corporation,
Miss Margaret Jennings.

MLJennings/t

[fol. 5683] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 365

W. E. Michalke, San Francisco

Internal Correspondence

March 21, 1960

From: P. J. Lopushinsky
Rome Office

To: District Managers
Assistant District Managers
Rome Cable Division Managers
Rome Cable Division Product Managers
Rome Cable Division Salesmen
Rome Cable Division Agents
Administrators

Re: Distributorship Agreement

Inasmuch as our new Distributorship Agreement will be put into use immediately, we are attaching a copy for your information and review.

We would like to pass on a word of comment, particularly to the Rome Cable Division Managers, regarding the *present Rome consignments*. New agreements are now being prepared and will be mailed to you shortly. You will note that the supplement to the agreement shows four product categories and will indicate the products currently approved for each consignment. For example, a distributor may, at present, have approval to carry only copper wire and cable products on consignment. Before shipment of any of the other three products can be made to his consigned stock, approval must be obtained by submitting an Application For Consigned Stock Approval. The application should indicate the additional products desired and further, show all other information pertinent to the product as outlined in the application.

As mentioned above, the new agreements are being prepared for our present Rome Cable consignments. These will be forwarded to the Rome Cable Division Managers for fur-

ther distribution, either to the individual salesman handling the account, or forwarded to the distributor by mail. We have found in most cases salesmen have indicated a preference to deliver the agreement personally for signature. In areas where this is impractical, a letter of transmittal can be used. The original copy should be returned to Consigned Stock Department, Rome, N. Y. Upon its return the old agreement will be considered as cancelled.

[fol. 5684] As Alcoa consignments are transferred to Rome, we will forward to the Rome Cable Division Managers our new agreements. There will be more details on this part later.

P. J. Lopushinsky.

PJL:je
Attachment

CC: Mr. G. E. Rolston, Rome, Mr. R. L. Williamson, Rome, Mr. F. S. Marks, Sr., Rome, Mr. J. B. Holloman, Rome.

[fol. 5685] Rome Cable Corporation

Rome, New York

Distributorship Agreement

This Agreement is made by and between Rome Cable Corporation, a Delaware corporation (operating as a division of Aluminum Company of America) having its principal office in Rome, New York (herein called "Rome"), and having an office in _____
(herein called "Distributor").

1. Delivery of Products to Distributor. Rome shall from time to time deliver to Distributor and Distributor shall receive at any of its warehouses, except such as may be excluded herefrom by Rome, such quantities of such products as shall be brought within the scope of this Agreement by subsequent writings signed by both parties (the same being herein called "Products"). The Products may be either the property of Rome or the property of Aluminum Company of America, a Pennsylvania corporation (herein

called "Alcoa"), it being recognized that Rome is acting as agent for Alcoa with respect to such of the Products as are the property of Alcoa. Notwithstanding the ownership of the Products, the transactions contemplated hereby shall be solely between Rome and the Distributor. Rome will deliver the Products, and will bear the cost of transportation for such delivery, to distributor's warehouse, in accordance with Rome's standard practices in connection with sales of the Products to other resellers.

2. Special Charges. If a Product is wound on reels for shipment, the returnable reels will be billed to the Distributor at the time of shipment to the Distributor on the basis of Rome's current reel price schedule. Reels returned in good condition, freight collect, to point of origin or such other point as shall be specified by Rome, will be credited at the prices originally billed to the Distributor. If, at the request of the Distributor, any service is performed with respect to any of the Products, such as, but not limited to, cutting, sawing or boxing, for which a special charge is normally made, Rome will invoice Distributor in the amount of such special charge at the time the Products are shipped to Distributor.

3. Title to, Storage of and Access to Products. Legal title to the Products prior to withdrawal pursuant to Distributor's exercise of its option hereinafter granted shall remain in Rome or Alcoa, as the case may be. Distributor shall take due and proper care of the Products, including the provision of safe, clean and dry storage facilities, and shall keep the Products available for convenient inspection and identification. Rome or its designated agent shall have the right during regular business hours to enter Distributor's premises to inspect or inventory the Products. Except as expressly provided herein, Distributor shall not remove any of the Products from the premises on which they are stored without first obtaining the written consent of Rome.

4. Risk of loss and Insurance. All risk of and responsibility for loss of or damage to the Products prior to withdrawal pursuant to the Distributor's exercise of its option hereinafter granted shall be in Distributor, except that the risk of loss of or damage to the same resulting from enemy attack, including any action taken by the military, naval or air forces of the United States in resisting enemy attack,

shall be in the owner (Rome or Alcoa); provided, however, that the foregoing exception shall not apply to loss or damage resulting from blackout, burglary, robbery, theft, larceny, pillage or looting, sabotage, vandalism, malicious mischief, acts done secretly by foreign enemy or agent of any government, or neglect of Distributor to use all reasonable means to save and preserve the Products after damage from enemy attack. Notwithstanding the foregoing, the owner shall insure the Product against loss or damage by theft, flood, fire, sprinkler leakage, wind, lightning, explosion, riot and civil commotion, aircraft and other vehicles, and smoke while the same are in the possession of Distributor. Such insurance shall be in the name of and for the benefit of the owner, and shall not cover any interest of Distributor. Distributor shall cooperate with the owner and with the insurance carriers with respect to inspections, safeguarding the Products and adjustment of losses. The owner shall be solely responsible for the sufficiency of such insurance and Distributor shall be relieved of all liability for loss or damage from any cause with respect to which such insurance is carried (except loss or damage from flood in excess of \$150,000.00) and for default on the part of any insurance carrier. The maintenance of such insurance by the owner shall not, however, in any way relieve or limit the liability of Distributor, hereinbefore specified, for loss or damage from any cause other than those with respect to which such insurance is carried.

5. Taxes on Products. Distributor shall pay all local property taxes and all other municipal and governmental charges (other than taxes on or measured by income) which may be assessed against it, against the owner of the Products, against Rome as agent for Alcoa, or against the Products or any of them by reason of their storage and existence in the state in which Distributor's warehouse or place of business may be located. If Distributor shall fail or refuse to pay any such tax or charge, Alcoa or Rome may pay the same and Distributor shall reimburse Rome for the amount thereof.

6. Filing Requirements. If Rome so requests, the Distributor will file this Agreement or a copy hereof in the manner provided by law, and will do all other things necessary to make this Agreement legal and valid and to assure to

Rome and Alcoa their respective rights, reserved or recognized herein, under the laws of each state in which the Distributor operates.

7. Reports. Rome shall from time to time supply Distributor with report forms and instructions for completion of such forms. On the _____ day of each month, Distributor shall report to Rome on such forms, in accordance with the instructions relating thereto, and as of the date specified in such forms or instructions. In addition, whenever Distributor is notified of a change in Rome's published prices, Distributor shall report to Rome on such forms as of the close of business on the day before such price change became effective.

[fol. 5686] 8. Distributor's Option to Purchase. Rome hereby grants to Distributor an option to purchase all or, from time to time, any part of the Products at Rome's price in effect at the time of exercise of such option, less such discount, if any, as Rome may from time to time establish. Exercise of the option with respect to any of the Products shall be by withdrawal thereof from the stock of Products. After such withdrawal Distributor shall not return any withdrawn Products to the stock of Products but shall keep the same properly segregated therefrom as its own property.

9. Invoicing and Payment. On receipt of each report made by Distributor pursuant to paragraph 7, Rome shall invoice Distributor for all products with respect to which Distributor exercised its option during the period covered by such report. Distributor shall remit to Rome for such Products in accordance with the regular terms and sales policy for such Products as of the time of sale, as contained in the published price sheets of Rome.

10. Sales by Distributor. All Products which Distributor purchases hereunder will be sold for its own account. No sales from stock shall be made by Distributor as agent for, or other representative of, Alcoa or Rome. No sales or contracts made by Distributor shall make or purport to make Alcoa or Rome a party, nor shall Alcoa or Rome incur any liability thereby or therefor.

11. Financial Statement. Distributor shall furnish a financial statement to Rome at such time or times as Rome shall request.

12. Slow Moving Products. Any Product which remains in Distributor's stock for six months may, upon the request of Rome, be returned to such destination as Rome shall designate, transportation charges to be prepaid and borne by Distributor. In the event that a Product is still in Distributor's stock at the end of eight months after Distributor's receipt thereof, Rome may invoice Distributor for such Product at Rome's price in effect at the time of invoicing. Upon receipt of such invoice Distributor shall exercise the option to purchase such Product and shall take it into its own stock.

13. Broken Packages. If Distributor shall break into any standard package full coil of electrical conductor, such breaking in shall constitute an exercise of the option to purchase the entire package and any remainder shall be taken by the Distributor into its own stock. Where covered or insulated electrical conductor is shipped to Distributor on reels, the Distributor will report the amount sold each month until there remains on the reel 200 feet or less, and at that time it shall exercise the option to purchase the balance and shall take it into its own stock.

14. Termination. Either of the parties may terminate this Agreement with or without cause, upon ninety days written notice delivered at the office of the other party or at such address as shall be supplied for the purpose of such notice. Notwithstanding the foregoing, if any proceeding in bankruptcy, receivership or insolvency, whether voluntary or involuntary, shall be instituted by or against Distributor, or if Distributor shall become insolvent or its corporate existence shall for any reason be terminated or its affairs wound up, or if Distributor shall make any assignment for the benefit of its creditors or commit any other act of bankruptcy, or if Rome should have reason to question the financial stability of Distributor, then and in any such event, Rome may terminate this Agreement immediately upon written notice to Distributor. In the event of termination of this Agreement, however caused:

- (a) Distributor shall forthwith transmit to Rome a statement of the Products on hand and sales made from the Products from the date of Distributor's last report to the effective date of termination, and

shall immediately remit to Rome for the Products so sold; and

- (b) Distributor shall forthwith, and at the cost and expense of the party terminating the Agreement, ship to such point as Rome shall designate all Products then in the possession of Distributor.

15. Modification of Agreement. This Agreement shall, with respect to the subject matter hereof, constitute the entire contract between the parties and supersede all existing agreements between them, whether oral or written. There are no verbal understandings or undertakings of any kind with respect hereto not expressly set forth herein. No agent of Rome shall have authority to change or modify any of the terms of this Agreement, except with and to the extent of the written consent of Rome. Any such change or modification made with regard to any particular order or orders, or with respect to any particular term or condition of this Agreement, shall apply only to the particular order or orders or term or condition with respect to which such change or modification shall have been made, and shall not be construed as a general waiver or modification as to any other order or as to any other term or condition of this Agreement.

16. Assignment. This Agreement shall be binding upon and inure to the benefit of the parties, their successors and assigns, but Distributor shall have no right to assign this Agreement without first obtaining the written consent of Rome.

17. Governing Law. This Agreement shall be construed in accordance with the laws of New York.

The parties have executed this Agreement in duplicate this _____ day of _____, 19____.

Rome Cable Corporation By _____, _____.

[fol. 5687]

Rome Cable Corporation

Rome, N. Y.

The Distributorship Agreement made between Rome Cable Corporation and _____ having an office in _____ on the _____ day of _____ 19____, is hereby supplemented as follows:

The word "Products" referred to in Paragraph 1 is hereby defined to include the following categories:

Copper Wire & Cable_____

Aluminum Wire & Cable_____

Aluminum Accessories_____

Aluminum Conduit_____

We have indicated above the products approved for this Agreement.

The parties have executed this supplement in duplicate this _____ day of _____ 19____.

Rome Cable Corporation, By _____, _____.

[fol. 5688] We suggest that supplements or revisions of this agreement be attached to this page.

2510

[fol. 5689] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 366

Internal Correspondence

June 23, 1960

From: Mr. J. R. Woods
To: Alcoa District Managers
Resident Representatives
Administrators
Managers Rome Cable Div. Sales
Rome Cable Div. Salesmen
Rome Cable Div. Agents
Rome General

Re: Aluminum Substitution

The attached paper was prepared as a discussion outline for presentation to the Rome Cable Division Field Sales Personnel during their training program here at Rome. We have received requests for copies from the salesmen who participated in the program and from several field locations since their return. In view of this interest, we are sending copies to all personnel interested in the sales of Insulated Aluminum Conductor.

John R. Woods.

JRW:ac
Attach: 1

cc: H. E. House—Massena, T. L. Gilbert—Massena.

[fol. 5690] Discussion Outline for Alcoa Sales Personnel

Economics of Aluminum Substitution Facts and Fallacies

I'm rather amused when I hear the margarine interests refer to "the high priced spread" rather than coming right out and saying "butter". This doesn't make much sense to me but I respect the judgement of professional advertising people, so at least during the initial stages of this discussion I'll refer to aluminum versus the high priced metal.

Now I am going to pose a question to each of you and I want you to give me an honest answer. I don't want the fact that you are a guest in the "Copper City" to influence your answer and I want you to forget, if possible, that your pay check comes from Alcoa. I'm going to give you some facts and I want you to put yourself in the buyer's position and tell me which metal you would specify for your insulated electrical conductor.

First, there is the high priced metal. It has nearly twice the conductivity of aluminum; it has a scrap metal value nearly as high as its original cost; it is ductile; it is easy to terminate; it is so easy to refine and fabricate that even the ancient Aztecs used it for utensils and jewelry; for equal ampacity and voltage drop it is smaller than aluminum; it takes less space and requires less insulation; it is not adversely affected by soil acids and alkalies and it is extremely easy to join and solder.

Now, let's take a look at aluminum. It has less conductivity; it uses more space and insulation per ampere; it requires special handling, special terminations and special techniques. Of course, it is lighter, has a lower more stable price and is in more plentiful supply.

[fol. 5691] Now, as a purchaser with these facts, tell me honestly, would you really buy aluminum or would you go the easy route and choose the high priced metal?

Those of you who are inclined to confess that you would choose the high priced metal didn't ask how high is "high priced". If you had asked this question, you could never have had any doubt in your mind because the high priced metal I was describing in such glowing terms was not copper but silver. It is doubtful that very many people would specify a silver conductor even though it does have all of

the desirable characteristics I outlined. I resorted to this subterfuge to bring home the point that silver, copper and aluminum are all good conductors, but the cost, availability and to some extent habit are the factors that determine which metal will be used. Aluminum will be specified over copper only because it has a lower price tag and is more plentiful and then only when a good selling job is done. How quickly and how completely aluminum displaces copper will depend entirely upon the relative cost and availability of these two metals, and how good a job we do of reminding the customer that silver and copper are superior conductors, but relatively expensive.

Let's look at the true facts that determine the economic advantage of aluminum over copper in both bare and insulated wire.

There are some basic facts that are as irrefutable as Ohm's Law. Let's analyze aluminum versus copper in the light of these facts first, so that we will all understand exactly where we stand. It may, at times, be to our advantage to distort these facts, but as good salesmen and good businessmen let's start with a basic understanding of true economy. Then, we can consider the commercial aspects that might influence us to go beyond true economy to prove in aluminum.

Here are some facts that are worth remembering when talking about aluminum versus copper.

[fol. 5692] Copper has a resistivity of 10.37 ohms per circular mils foot

Aluminum is next best with 17.0 ohms per circular mils foot

Copper has a specific gravity of 8.89

Aluminum has a specific gravity of 2.70

You can work out a ratio on this and come up with the fact that one pound of aluminum will do the work electrically of two pounds of copper. That is, an aluminum conductor will offer the same resistance and result in the same losses as a copper conductor weighing twice as much. You can come up with this fact by remembering that aluminum weighs .3 times as much as copper. Physically, three tenths of a lb. of aluminum will do the job of 1 lb. of copper. However,

aluminum has only 62% conductivity, so electrically you must divide by .62, which results in the figure .50 or $\frac{1}{2}$ lb. of aluminum is the electrical equivalent of 1 lb. of copper. Don't forget and don't let your customers forget that they must buy 2 lbs. of copper at 33¢ to do the job of 1 lb. of aluminum at 26¢.

Now let's apply this rule of thumb to the wire business and see how we make out. You are all familiar with the fact that #4 aluminum is roughly the equivalent of #6 copper. Let's assume for the sake of this discussion that it costs us the same amount of money to reduce the aluminum pig to a #4 solid as it does to reduce a wire bar to #6 solid. While there is certainly some room for argument on this, it is a reasonable assumption and it will not have any significant effect on our analysis. It is undoubtedly a little cheaper to reduce the aluminum but let's save the difference and increase Alcoa's earnings from \$2.52 to \$2.53 per share. If you will go along with me on this assumption, we will go back to #4 aluminum versus #6 copper.

1,000 ft. #6 copper weighs 79 lbs. and at 33¢ per lb. the metal costs \$26.07

1,000 ft. #4 aluminum weighs 38 lbs. and at 26¢ per lb. the metal costs \$9.88

[fol. 5693] Note that the 1 lb. of aluminum is more than doing the work of 2 lbs. of copper and going back to our assumption that it costs about the same to get both into wire form, we find that our customer can save about \$16.00 per thousand feet by using aluminum. This is a true metal savings and when coupled with your superior salesmanship, it has made a lot of copper available to the costume jewelry trade that used to go into transmission and distribution conductors.

\$16.00 per thousand feet is a pretty healthy advantage for aluminum and it assures our position in the overhead conductor business. It is unfortunate that some irresponsible price cutting has widened this gap to \$20.00. That extra \$4.00 is coming out of our hide, when, as a matter of fact, we don't even need a \$16.00 advantage to sell aluminum.

Bearing in mind that we are still talking about the true economics of aluminum over copper, let's see what happens

to this \$16.00 savings when we start putting insulation on the conductor. We will start with a simple polyethylene line wire and then progress to more complicated constructions to illustrate the point.

If we apply 1/32" polyethylene over #6 solid, it requires 8 lbs. of compound. To apply 1/32" polyethylene over the larger #4 aluminum, requires 10 lbs. of compound. This additional two lbs. of material at about 35¢ per lb. means we must deduct 70¢ per thousand feet from the \$16.00 saving to arrive at our true savings. In addition to increased material costs, there are increased labor costs. If the extruder has a capacity of 160 lbs. per hour, we can insulate 20,000 ft. of #6 solid per hour, but only 16,000 ft. #4 solid. Our labor costs and all other costs that are tied to production capacity have increased 25%. It is evident that the \$16.00 savings is no longer valid. We have got to deduct the increased material and labor costs incurred and pass the [fol. 5694] balance along to the customer as an incentive to buy aluminum. Let's say this saving is now only \$14.00 per thousand feet, still a healthy advantage and more cop- per for the costume jewelry trade.

Now let's go a little further and see what happens to our \$16.00 metal savings when we decide to make a more complicated cable. If we were to apply 12/64" insulation, we'd find that it takes 85 lbs. for the #6 copper and 95 lbs. for the #4 aluminum. This means that the material cost is up \$3.50, as a consequence of using aluminum. As in the case of the 1/32" polyethylene, there is an increased labor cost. So, our true savings on this more complicated construction is say \$10.00 versus \$14.00 on the simpler construction. If we were then to shield this wire, it would cost \$4.50 more for the shielding tape to cover the larger diameter and our metal savings would be reduced to \$5.50. It is obvious that by extrapolation we can arrive at a point where the metal savings are overcome by the increased costs of processing a larger diameter conductor. How soon, if ever, we arrive at this point, depends entirely upon the amount and the cost of the covering material.

I have tried to lead you down the path of so-called metal substitution pricing. Simply stated, this method merely means that to price an aluminum cable we subtract the copper metal cost from the copper cable selling price and add

back in the aluminum metal cost in its place. The validity of this method is based upon the assumption that it costs the same amount of money to reduce an aluminum pig and a copper wire bar to a finished conductor and that the price of the copper cable was based on a correct cost versus selling price ratio in the first place. There is a great deal of room for argument on both of these assumptions and, as a matter of fact, we know they are not entirely correct. However, metal substitution is a reasonably accurate [fol. 5695] reflection of the true economy of aluminum over copper and, more important, it is the only real yardstick we have for measuring an Insulating Plant's profit performance. The copper wire and cable business is not a high profit industry. If we can make 4% on sales we are doing extremely well. Every time we sell insulated aluminum at a price lower than the metal substitution formula, we are taking the difference out of our potential profit and there can be absolutely no argument about that fact.

So much for the economic facts of aluminum substitution. We should all know and be guided by these facts but selling is an art and not a science, and unfortunately facts do not always prevail in the market place. We are all anxious to sell aluminum. We are even more anxious to sell Alcoa aluminum. But, I, for one, dislike working for a non-profit organization. If it comes to that, I will get a great deal more satisfaction as a member of the Salvation Army. We may find it expedient to distort the facts a little to give a bigger edge than the metal savings will justify. If we do this in the form of meeting competition to maintain our position, or to introduce and promote aluminum on the assumption that we can raise the price a little after the customer finds out that he really likes it—O. K. If, on the other hand, we try to prove in aluminum where there is no real savings, we are in trouble. To give you an example of this, imagine the spot you would be in if you reduced the price of insulated aluminum cable way below cost just to get the customer to switch over. After he had redesigned and retooled for aluminum, you come back and want to raise the price to a profitable level. If there was no real savings in the first place, you must either raise the price above an equivalent copper cable or go without profit—

you can't win. You end up with an irate customer or a profitless organization. The point I am trying to make is, [fol. 5696] we should strive to sell aluminum on the basis of its true economic advantages. We may have to settle for a temporary narrow margin to get aluminum accepted, but in the long run aluminum should stand on its own two feet if our gains are to be permanent.

Up until now we have talked about the economics of aluminum in the finished electrical cable only. The customer is obviously interested in installed cost rather than conductor cost. So, let's see what happens when we start using an aluminum cable versus a copper cable.

When we started this discussion, we found that the maximum savings on a #4 aluminum was \$16.00. We then started to peck away at this until the savings were down to \$5.50 per thousand feet. When we install this cable, it takes more space and enclosed space costs money, so the savings to the customer may be further reduced. If, after taking this last factor into consideration, there is still something left of the \$16.00, and there usually is, then installed aluminum cable is cheaper than installed copper cable.

Now that I have beat down your \$16.00 to the point where aluminum doesn't look as good as it did, I'm going to build you up again by pointing out that aluminum can, in many cases, do the job of copper without an appreciable increase in size. When conditions permit the substitution of aluminum for copper on a current carrying capacity basis, we practically have a license to steal. We learned earlier that based on voltage drop, a lb. of aluminum would do the same electrical job as two lbs. of copper. On a current carrying capacity basis, that same lb. of aluminum will do the job of about 2½ lbs. of copper. Service entrance cable is a good example of permissible substitution of aluminum for copper on an ampacity basis. The run is short, the voltage drop is of little consequence, so a #2 aluminum can be substituted for a #3 copper for 100 ampere service. The [fol. 5697] #2 aluminum weighs 61 lbs., versus 162 lbs. for copper. There are many other cases where aluminum can be substituted for copper without increasing either the conductor size or the conduit size. For instance, there are 16—440 volt 3-phase motor sizes between ½ and 100 h.p. 62% of these motors can be fed with aluminum cable with-

out an increase in conductor size. 75% of the circuits can be run with aluminum conductor without increasing the conduit size. To take advantage of substituting on an ampacity basis requires engineering and selling in the design stages of the electrical system. Without complete knowledge of the system demands, we must take a conservative approach and substitute on a voltage drop basis.

It is beyond the scope of this discussion to cover all of the intricacies of aluminum substitution. We are ready to help you on jobs as they come up and you will be given a great deal more ammunition along these lines in the near future.

I would like to sum up this discussion by repeating some salient facts.

1. We are willing and anxious to substitute aluminum for copper in insulated cable.

2. It is generally economical to substitute aluminum for copper.

3. It is to everyone's benefit to prove in aluminum on actual rather than artificial savings. It is a good metal and can stand on its own two feet.

4. Copper is, has been and always will be a better conductor than aluminum. Don't weaken your position by trying to deny it. Silver is also a good conductor, but who can afford it.

5. The strong points of aluminum are adequate conductivity, plentiful supply, light weight and a low stable price.

In closing I would like to invite your attention to two very important figures that I just happened to run across the other day. They were 858,460,213 and 2.52. You may recognize them as our company's 1959 net sales and earnings per share. You, your fellow salesmen and everyone here in [fol. 5698] Rome Headquarters Sales have an opportunity to add a digit to the first number above. If we do it, it will be very gratifying. If, however, we contribute the added digit without making a corresponding contribution to the 2.52, we haven't accomplished a thing. In other words, sell something. Preferably sell aluminum. Sell copper, sell steel, sell Rome Cable Manuals, sell anything, but sell it at a profit.

J. R. Woods.

JRW:ac

[fol. 5699] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 367

Internal Correspondence

September 6, 1960.

From: J. B. Holloman, Rome Cable Div., Rome
To: See Distribution List

Electrical Conductor Distributor Memorandum No. 3
Sale of Overhead T&D Conductors Through Distributors

The purpose of this letter is to outline our policy regarding the sale of bare and weatherproof aluminum conductors through electrical distributors. So that there will be no misunderstanding about the products involved, they are listed below:

Bare ACSR and Bare all-aluminum conductor
Weather-resistant aluminum line conductors
Aluminum self-supporting secondary and service drop
cables
Rome Trimline Primary Distribution Systems

The greater volume of these products continues to be sold direct to the user. Any distributor sales program we follow must recognize this fact. If our selected distributors are willing to provide a service under these circumstances, it is our intention to support their efforts in every reasonable way.

It is apparent that we now have too many distributors for these products. We cannot expect full cooperation from our stocking distributors if we continue to sell through those who do business with us only as a matter of convenience. The program by which we expect to arrive at more restricted distribution will be developed in the following specific steps:

1. Consigned Stock Distributors. Rome Division distributors who have consigned stocks of these conductors now number in the hundreds. The consignment method of distribution [fol. 5700] has certain advantages, particularly

where the manufacturer also sells direct to the user. As we have elected to do business through consigned stocks, we must reduce our variety of selling methods to gain the maximum cooperation from our consignment distributors.

2. Purchased Stock Distributors. Except in a very few locations, the distributor who buys conductors into his stock is not compatible with the consignment distributor. It is difficult to control the type and quantities of material that move through purchased stocks. Accordingly, the purchase of these conductors into stock is eliminated. This applies also to the consignment distributor who obtains orders for conductors he does not carry in his stock. We will in such cases require the item to be shipped directly to the user.

3. Agency Sale of Overhead Conductors. Attached is a copy of the Agency Agreement similar to that which has been used by Alcoa for a number of years. This agreement provides a valuable service to our distribution program by permitting the Agent to sell only at prices authorized by the Rome Division. In addition to a number of individual agreements, we have national Agency arrangements with the following organizations:

Graybar Electric Co.
General Electric Supply Co.
Westinghouse Electric Supply Co.
Line Material Co.

All distributors who stock these products have signed or will be asked to sign Agency Agreements. The discounted drop shipment of overhead conductors is now eliminated, and future shipments direct to the user will be made only as an Agency Sale. Administration of Agency orders will not be discussed here, as Alcoa sales offices should be familiar with the entry procedure.

[fol. 5701] 4. Designation of Agency. You will from time to time receive orders for these products from approved Rome Cable Division distributors who do not have stocks or who are not signed agents. These orders may, at your option, be returned to the distributor or entered on the so-called "one-shot Agency basis".

We have attached a copy of the "Designation of Agent"

form and also, in part, a copy of Mr. Dixon Lewis's memorandum No. 43 dated January 21, 1955, which explains the procedure under which it is used. Our present policy limits the use of the Designation of Agent Form to approved Rome distributors. Supplies of this form are being mailed to all district, branch, and resident offices. They should be put into use immediately.

5. Discounts & Commissions. For your convenience, we have listed on the attached sheet the Agency commissions for sales of these products, as well as the discounts that apply to sales out of consigned stocks.

6. Control of Quantities Shipped into Stock. The 4.25% stocking and handling fee is allowed to distributors only on conductor actually shipped into stock. Wherever it comes to your attention that these products are being diverted and are not going into the distributor's warehouse, the allowance should be withdrawn. This should be clearly understood by the distributor handling our products. We expect the distributor to carry adequate stocks of the items which he normally sells. Requirements for non-stock items or large quantities of stock items must be justified for shipment to the distributor or shipped direct to the user on the agency basis.

These steps have been taken to provide a more orderly method of doing business through distributors. In view of competitive practices common in today's market, such a [fol. 5702] course of action places additional responsibilities on the sales department. However, any compromise of the distributor function prevents its proper balance with direct selling. This balance must be maintained if we are to promote a sound distributor program.

J. B. Holloman.

JBH:jb

Attachments

Distribution List: Rome Cable Division Sales Managers, Rome Cable Division Salesmen, Alcoa District Managers, Alcoa Assistant District Managers, Alcoa Branch Managers, Resident Representatives, Alcoa District Administrative Managers, Alcoa Assistant Administrative Man-

agers, Administrators, Salesmen—Rome Cable Division Agents.

Rome, A. D. R. Fraser, G. E. Rolston, R. L. Williamson, F. S. Marks, D. H. Thayer, J. R. Woods, W. W. Knapp, R. A. Lewis, H. C. Carrier, G. A. Brodock, P. J. Lopushinsky.

Pittsburgh, F. R. Dallye, H. H. Rodee, Dixon Lewis, G. B. D. Peterson, W. T. Mitman, A. F. Gronning, J. V. Kohler.

[fol. 5703]

Attachment

Gentlemen:

We hereby engage _____, to act as Agent under the terms specified herein, in the sale of our electrical conductor and accessories for direct shipment to customers located in the _____.

Your representatives will normally obtain the selling prices which they are authorized to quote from our district or branch office having responsibility in the area where the business is done.

The orders which you obtain on our behalf must be transmitted through such office and are subject to acceptance by us in Rome. Such office may also designate certain customers which are excluded from your agency.

This arrangement is non-exclusive in both directions, i.e., we are free to engage other Agents for the same purpose and you are not bound to sell bare and covered aluminum and copper overhead conductors and accessories on our behalf only and we are free to solicit and accept orders directly from these customers. Commission will apply only to orders actually secured by you.

As a matter of convenience, we will expect, in each case, to receive instructions from you as to material specified, and the terms and conditions of the customer's order. The [fol. 5704] memorandum of sale received by us from you should contain the following notation:

"This order covers merchandise sold through us as your agent, and we assume responsibility for payment. Invoice should be rendered directly to us."

After having shipped in accordance with your instructions, we will look to you for payment since you are assuming full responsibility for such accounts, including collection and payment to the taxing authority of sales or use taxes when applicable. In rendering our invoices to you, allowance will be made for your selling commission.

For these specific services we will pay you the following commissions on orders secured by you as Agent and accepted by us for direct shipment by us to customers:

Aluminum**Bare ACSR and bare all-aluminum conductor**

- (a) Sizes #6 AWG through 336,400 cm, any quantity 3%
- (b) Sizes larger than 336,400 cm, any quantity 2%
- Weather-resistant line conductors.....4%
- Self-supporting secondary and service drop cables 4%
- Accessories5%

Copper**Bare solid and stranded copper overhead conductors** \$.005/#**Weatherproof solid and stranded overhead conductors** \$.0075/#**Rome Trimline Primary Distribution Systems.....5%**

You shall absolve us from all responsibility for any claims where such claims exceed our limits of responsibility as set forth under "Terms and Conditions" printed on the back of our regular "Acknowledgment of Order". There are no [fol. 5705] reasons to expect that selling of our electrical conductor and accessories will involve you in any patent suits but it is understood that we take the responsibility of protecting you in this respect.

We think the above paragraphs describe the arrangement completely but it may be well to call attention to the fact that your Agency arrangement does not include orders from you for shipment to your own stores for resale, or to any other reselling stores.

Naturally, there may be reasons for review occasionally, and we shall each feel free to call on the other for that purpose. Also, it is agreed that this letter is effective as of _____ and may be cancelled by either party upon three months' notice.

Will you please signify your agreement by signing, dating, and returning the attached duplicate signed copy of this letter.

Very truly yours, Rome Cable Corporation.

JBH:jb

[fol. 5706] Rome Cable Division of Alcoa
Rome, New York

Name
Address

Designation of Agent

We have taken the liberty of acknowledging your order No. _____ dated _____ (subject to acceptance at our home office in Rome) as a sale by us to the customer designated as the consignee therein, through you as our agent. The attached acknowledgment of your order as an agency transaction is subject to the following understanding:

1. This is not a sale to you for resale.
2. You are hereby designated our agent with respect to the single transaction represented by the attached acknowledgment of our Sales Order No. _____, dated _____, with authority, as an undisclosed agent for us, to sell such material to the consignee named therein under the terms stated on such acknowledgment.
3. You shall assume responsibility for payment and as a matter of convenience the invoice or invoices for such material will be rendered directly to you.
4. If state or local sales or use taxes are applicable to this transaction, you shall assume responsibility for collection of such taxes from the customer and for remitting the same to the taxing authorities.
5. For your services in connection with this transaction we will pay you a commission of _____% of the gross price of the material shown on the invoice. The commission will be deducted from the invoice which will be rendered to you.

We appreciate the opportunity to serve you and hope that you will accept this designation of agency. We shall assume that you have accepted the above conditions unless we hear from you to the contrary within five days.

Very truly yours, Rome Cable Corporation.

[fol. 5707]

Attachment

Electrical Conductor Memorandum No. 43
by Dixon Lewis, Pittsburgh—January 21, 1955

(Quoted in Part)

We are concerned with two types of orders from resellers of electrical supplies and equipment, and both types can be converted into agency transactions. The first type is the order from a supply house for direct shipment to a customer who is named on the order as the consignee. By attaching a "Designation of Agent" form to the acknowledgment copy of the sales order, such an order can be entered immediately by the sales office as an electrical conductor agency order, showing proper commission deductions in the pricing column and carrying the usual agency responsibility and sales or use tax notations as outlined in Electrical Conductor Memorandum No. 31 and No. 39. In addition, the following acknowledgment note should be added on the sales order form: "Designation of Agent Form Attached to Acknowledgment".

The "Designation of Agent" form should be prepared in triplicate and the original attached to the acknowledgment copy of the order which is mailed to the supply house. The duplicate copy will remain with the sales office copy of the order, and the triplicate will be mailed to the Product Manager's office in Pittsburgh.

[fol. 5708] Note that the supply house has five days in which they can refuse to accept the agency designation. In this event it will be necessary for the sales office to cancel the order as we have no other arrangement for selling to a supply house for resale.

The second type of order is one in which the supply house ordering the material is also named in the order as the consignee. Since this material is obviously for resale, such an order must be rejected unless it can be converted into an agency order by obtaining the name of the ultimate customer as the consignee. One way to do this is to telephone the supply house, explain our agency arrangement, and ask them to give the name of their customer to be inserted in the order. Another way is to use the attached suggested form letter to "X-Y-Z Electrical Supply Company", accom-

panied by a blank "Designation of Agent" form. If upon receipt of this letter the supply house elects to return the order with their customer's name, then the "Designation of Agent" form will be prepared in triplicate and the original attached to the acknowledgment copy of the sales order when it is entered, in accordance with the procedure outlined above.

It is immaterial whether actual shipment is made direct to the customer or sent to the customer in care of the agent's warehouse or shipping dock; the essential point in the agency order is that the ultimate customer be named in the order as the consignee. Note that the "End Use" in all agency orders is the use by the ultimate customer and [fol. 5709], not by the agent, and that the customer must be the actual user of the material such as a power company, cooperative or contractor.

The foregoing procedure is not only a protection to everyone concerned but we believe it is fair to our established agents and distributors. The sales office always has the option of refusing to accept an order from a supply house because of policy reasons. Special situations should be discussed with the Product Manager's office.

[fol. 5710] Rate of Commissions for Agency Sales

Aluminum**Bare ACSR and bare all-aluminum conductor**

(a) Sizes #6 AWG through 336,400 cm, any quantity 3%

(b) Sizes larger than 336,400 cm, any quantity .. 2%

Weather-resistant line conductors 4%**Self-supporting secondary and service drop cables** .. 4%**Accessories** 5%**Copper**

Although bare and weatherproof copper are included in the revised Agency Agreements, there is no present intention to change the existing method of sales for these products. Both discounted drop shipments and purchasing into distributors' stocks are to be continued.

Rome Trimline Primary Distribution Systems 5%**Discounts for Sales From Distributors' Consigned Stocks** 3**Aluminum****Bare ACSR and bare all-aluminum conductor**

(a) Sizes #6 AWG through 336,400 cm, any quantity 3%

(b) Sizes larger than 336,400 cm, any quantity .. 2%

Weather-resistant line conductors 4%**Self-supporting secondary and service drop cables** .. 4%

(A stocking and handling allowance of 4.25% will be applied to net value of invoices against reported sales of above items from consigned stocks.)

Rome Trimline Primary Distribution**Systems** **Not Consignable**

jb

[fol. 5711] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 369

Internal Correspondence

January 9, 1961.

From: J. B. Holloman Rome Cable Div., Rome
To: A. K. Buckenmaier, Detroit

Re: Fitzpatrick Electric Supply Co.

Attached is a photostat copy of the signed Agency Agreement between the Rome Cable Division and the above distributor. This Agreement superseded the original Alcoa Agency Agreement and was sent directly to the distributor for signature. Attached also is a letter of amendment dated January 9 which reflects the change in commissions on certain conductor sizes.

We suggest you keep these Agreements and letters of amendment as a part of your permanent file.

J. B. Holloman.

JBH:jb
Attachments

Copy sent to C. C. Crompton—Jackson 1-12-61.

[fol. 5712]

January 9, 1961.

Fitzpatrick Electric Supply Company
444 Irwin Avenue
Muskegon, Michigan

Gentlemen:

Please refer to our Agency Agreement dated September 1, 1960, covering sales of our products by you for direct shipment to customers. This is to advise that effective for orders dated on and after December 14, 1960, the scale of commissions paid you on sales of Alcoa electrical conductors and accessories will be as follows:

Aluminum**Bare ACSR and bare all-aluminum conductor**

- (a) Sizes #6 AWG through 336,400 cm, except ACSR stranded conductors, 8/1, 12/7, and 16/19 3%
- (b) Sizes larger than 336,400 cm \$.005/#
- (c) ACSR stranded conductors, 8/1, 12/7, and 16/19 \$.005/#

Weather-resistant line conductors 4%

Self-supporting secondary and service drop cables 4%

Accessories 5%

Copper

Bare solid and stranded, copper overhead conductors \$.005/#

Weatherproof solid and stranded overhead conductors \$.0075/#

Rome Trimline Primary Distribution Systems 5%

[fol. 5713] The change from previous commission rates of 2% to \$.005 per pound effects only the bare ACSR and bare all-aluminum conductor in sizes larger than 336.4 MCM and in the following ACSR strandings: 8/1, 12/7, and 16/19.

We shall appreciate acknowledgment of your understand-

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ing of this amendment by signing, dating and returning the attached duplicate copy of this letter. Our district and branch offices have been advised of this revision.

Very truly yours, Rome Cable Division of Alcoa,
James G. Holloman. Fitzpatrick Electric Supply
Co., By —, —.

Date: —

JBH:jb

[fol. 5714]

September 1, 1960.

Fitzpatrick Electric Supply Co.
444 Irwin Avenue
Muskegon, Michigan

Gentlemen:

We hereby engage Fitzpatrick Electric Supply Co. to act as Agent under the terms specified herein, in the sale of our electrical conductor and accessories for direct shipment to customers located in the following territory:

Michigan: Counties of Antrim, Benzie, Charlevoix, Cheboygan, Emmet, Grand Traverse, Kalkaska, Lake, Leelanau, Manistee, Mason, Mecosta, Missaukee, Montcalm, Muskegon, Newaygo, Oceana, Osceola, Ottawa and Wexford.

Your representatives will normally obtain the selling prices which they are authorized to quote from our branch office in Jackson, Michigan. The orders which you obtain on our behalf must be transmitted through such office and are subject to acceptance by us in Rome. Such office may also designate certain customers which are excluded from your agency.

This arrangement is non-exclusive in both directions, i.e., we are free to engage other Agents for the same purpose and you are not bound to sell bare and covered aluminum and copper overhead conductors and accessories on our behalf only and we are free to solicit and accept orders directly from these customers. Commission will apply only to orders actually secured by you.

As a matter of convenience, we will expect, in each case, to receive instructions from you as to material specified, and the terms and conditions of the customer's order. The [fol. 5715] memorandum of sale received by us from you should contain the following notation:

"This order covers merchandise sold through us as your agent, and we assume responsibility for payment. Invoice should be rendered directly to us."

After having shipped in accordance with your instructions, we will look to you for payment since you are assuming full responsibility for such accounts, including collection and payment to the taxing authority of sales or use

taxes when applicable. In rendering our invoices to you, allowance will be made for your selling commission.

For these specific services we will pay you the following commissions on orders secured by you as Agent and accepted by us for direct shipment by us to customers:

Aluminum

Bare ACSR and bare all-aluminum conductor

- | | |
|--|----|
| (a) Sizes #6 AWG through 336,400 cm,
any quantity | 3% |
| (b) Sizes larger than 336,400 cm, any
quantity | 2% |

Weather-resistant line conductors	4%
Self-supporting secondary and service drop cables	4%
Accessories	5%

Copper

Bare solid and stranded copper overhead conductors	\$.005/#
Weatherproof solid and stranded overhead conductors	\$.0075/#

Rome Trimline Primary Distribution Systems 5%

You shall absolve us from all responsibility for any claims where such claims exceed our limits of responsibility as set forth under "Terms and Conditions" printed on the back of our regular "Acknowledgment of Order". There are no [fol. 5716] reasons to expect that selling of our electrical conductor and accessories will involve you in any patent suits but it is understood that we take the responsibility of protecting you in this respect.

We think the above paragraphs describe the arrangement completely but it may be well to call attention to the fact that your Agency arrangement does not include orders from you for shipment to your own stores for resale, or to any other reselling stores.

Naturally, there may be reasons for review occasionally, and we shall each feel free to call on the other for that purpose. Also, it is agreed that this letter is effective as of September 1, 1960, and may be cancelled by either party upon three months' notice.

Will you please signify your agreement by signing, dating and returning the attached duplicate signed copy of this letter.

Very truly yours, Rome Cable Corporation, F. S. Marks, Vice President, Manager of Distribution. Fitzpatrick Electric Supply Company, By George Anacher.

Date Sept. 15, 1960.

JBH:jb

[fol. 5717] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 370

Internal Correspondence

January 23, 1961.

From: J. B. Holloman, Rome Cable Div., Rome
To: Rome Cable Div. Managers

Re: Approved Distributor List

All Alcoa consigned stocks and agency agreements have now been transferred to the Rome Cable Division. It is our intention to immediately prepare an approved distributor list which will identify Rome Cable Division's recognized distributors and the products which we expect to sell through each of these distributors. We ask your help in providing names of those distributors with which you are presently working and the Rome Division products they sell.

The attached sample sheet will indicate how we would like to have these lists prepared. If the distributor account is located within the district sales office jurisdiction, it should be so indicated. If it falls within a branch office territory, then both the district and the branch should be shown on these listings.

The code used should be self-explanatory. It is recognized that many of your distributors handle only insulated copper conductors, while others are primarily concerned with our

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overhead aluminum products. All of the national chain houses, such as Graybar, Gesco, etc., sell aluminum conductors and accessories under Headquarters Agency Agreements, and the designation "A" should appear after their individual houses in these last two columns. Where there are consigned stocks of these products, the letter "C" should also appear. We have, in addition, signed Agency Agreements with certain independent supply houses, and these also should be identified by the letter "A".

[fol. 5718] We recognize that these lists may take some time to prepare; however, we would appreciate your giving this your immediate attention so that we may have them not later than February 10.

J. B. Holloman.

JBH:jb
Attachment

[fol. 5719]

Approved Distributor List

District____
Branch____

	Copper Insulated	Steel Conduit	Aluminum Conduit	Overhead Aluminum Conductors	Access- ories
ABC Electric Supply Co. Greenville, Texas	C	D	C	A	A
Graybar Electric Co. Lubbock, Texas	D	D	C	A-C	A-C
Industrial Electric Supply Big Spring, Texas	D	D	D	D	A

C—Consigned Stock.

D—Distributor, Subject to Product Policies.

A—Agent.

[Vol. 5720] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 371

Pipe Line Application of Wire and Cable

**Cable insulations of many types are now available;
uses depend on wiring location, special conditions**

R. C. GRAHAM

THE basic needs regarding cable insulations and wiring are much the same in the pipe line as in any other industry—lower costs, reduced dimensions, easier installation, improved performance, and longer life. The ways and means in achieving these needs, however, sometimes presents an entirely different problem than for other industries. Most cable manufacturers agree that pipe line service conditions are one of the severest of all cable applications. This situation requires unusually careful attention and selection of cable materials, properties, and design.

A brief consideration of the purpose of the cable insulation and its non-metallic covering may be helpful. The main function of the insulation or dielectric is to provide safe and durable electrical insulating value. The words "safe" and "durable" mean that it should possess adequate resistance to any deteriorating influences on its electrical insulating value that it may be exposed to during its normal life. Factors such as resistance to water and heat aging are highly desirable insulation characteristics if electrical stability is to be maintained. The resistance to other external influences such as weathering or sunlight, flame, oils, acids, alkalis, solvents and the like, may be, and usually are, provided by the insulation covering unless the inherent properties of the insulation itself preclude the need for further protection.

Primary function of the insulation covering is to provide the necessary degree of chemical or physical protection not already provided by the insulation. The insulation covering is also intended to protect the insulation from mechanical abuses incidental to operation and, principally, installation. Such coverings may be in the form of braids or sheaths (jackets), although the use of cotton braided cable coverings with their subsequent deterioration and rotting should now be a thing of the past with the modern synthetic sheathing and fibre materials available.

The Author

R. C. Graham is chief engineer for Buns Cable Corporation, Buns, New York. Since his graduation as an electrical engineer from Union College, Schenectady, New York, Graham has been associated with the wire and cable industry for more than 20 years in various technical capacities including production, research, and product engineering and application. In his present capacity, he has been in daily contact with cable insulations and problems—particularly those associated with the pipe line, gasoline and chemical industries. Graham has been a member of several government and industry committees including AIEE, IEEE, NEMA, IPCSA, IASG and others. He is the author of many technical papers pertaining to wire and cable design, development, and application.

Insulating and sheathing materials to be reviewed may be classified as either thermosetting or thermoplastic. First to be considered is the thermosetting group, of which rubber or its synthetic counterpart, is probably the most familiar material.

Thermosetting Materials

Insofar as pipe line wiring jobs are concerned there are now relatively few insulating compounds that would be of special significance in spite of a multitude of trade names. The first of these is a moderately low cost, general purpose compound developed since the wartime advent of Buna S synthetic rubber and possessing the dual feature of good resistance to both heat and water—it is suitable for 75 C temperature rating and for use in wet locations. It is sometimes referred to as a combined RH and RW insulation and when used under an appropriate covering,

can be safely recommended for nearly any 600 v a-c power circuit wiring application. It is especially suitable for secondaries and underground services.

Another useful but slightly higher in cost rubber insulation is the so-called oil-base ozone-resistant type of compound whose dominant constituent is a vulcanized vegetable oil. This insulation also possesses excellent heat and moisture resistant properties and may be rated at 75 C. Long experience has indicated that this high dielectric strength and corona-resistant compound may be safely used as power cable insulation up through 15 kv and possibly higher.

Butyl synthetic rubber has within recent years been introduced as cable insulation but long time performance records are not yet available. Indications are, however, that it may be recommended for similar ozone-resistant rubber compound applications. Industry specifications for such a compound recently have been established.

Performance of these rubber insulations in most applications would be short-lived if they were not protected adequately against the various exposed elements and reagents. The best known non-metallic sheathing material, Polychloroprene (Neoprene) is now almost universally accepted for this important application since it conveniently provides the desired functions of a sheath. Electrically, most Neoprene compounds are relatively poor, but their genuine toughness and resistance to abuse plus good heat, flame, and sunlight resistance, qualify their use as non-metallic protective sheaths. Neoprene is also resistant to low concentrations of chemical reagents at normal temperatures. However, principal dependence for moisture resistance must be placed on the insulation proper. Neither does Neoprene possess adequate resistance to severe gasoline or oil conditions, since it may be permeated by these fluids and associated vapors. For most general purpose wiring jobs, inside, underground or over-

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head, this material makes a good protective sheath for the rubber insulation.

The newest and, right now, the most expensive thermosetting insulation, is so-called "Silastic" or silicone rubber. This recently developed material possesses many interesting properties that will undoubtedly find certain applications in the petroleum and pipe line industry where excessive heat is a problem. Its chief virtue is its ability to operate over a very wide temperature range from -55°C to $+150^{\circ}\text{C}$. A problem exists in finding some tough non-metallic protective covering other than a glass fiber or asbestos braid that will be able to perform over a similar temperature range. Of course, a lead sheath provides a suitable metallic covering.

Thermoplastic Materials

The best known and most widely used thermoplastic material is Polyvinyl Chloride or its copolymer with vinylacetate—let us call it PVC. This is the material that has been used as insulation on Types T and TW building wires and, so far, has consisted of a compound mixture of resin, liquid monomeric plasticizers, fillers, and pigments. PVC has so many virtues that it may serve as a combined insulation and sheath. In itself—this means simplicity, low cost, small dimensions, easy installation, etc. PVC has reasonably good electrical characteristics but its use as power cable insulation is generally limited to 600 v a-c.

It lends itself particularly well to pipe line and refinery wiring because of its inherent resistance to flame, sunlight and weather, inorganic acids, oils, and many chemical reagents—even excellent Polychloroprene in these latter respects. Many manufacturers add a factory applied surface lubricant that greatly reduces pulling tensions. Such insulated cables may be used for almost any type of indoor or outdoor wiring and a few types of outdoor wiring. It is being successfully used directly in the earth by several utilities for street lighting and other applications.

A recent development in PVC compounds has been accomplished in which poly-ester type plasticizers have been substituted for the usual monomeric plasticizers, resulting in superior performance improvements of special interest to your industry, since it will mean added resistance to oil, gasoline, and other chemicals, plus increased resistance to heat and deformation.

The next thermoplastic material in popularity is Polyethylene, which is now substantially equivalent in cost to PVC. Polyethylene, a pure hydrocarbon resin (not a compound), has many advantages to qualify it for cable insula-

tion or sheaths for the oil industry. Its electrical properties, resistance to moisture, and cold temperature characteristics are superior to any other now regularly available non-metallic cable covering.

Being thermoplastic it is subject to appreciable heat deformation at or above its melting point of 105°C . However, there is practically no heat deformation up to 90°C , and is superior to PVC in this respect. If the circuit is to be subjected to frequent or heavy uncontrollable overloads, Polyethylene should not be used, although it is entirely satisfactory in this respect at its rated maximum temperature (75°C) or lower. Polyethylene is resistant to weather, most oils up to temperatures of 50°C and most solvents (not aromatics). Because of its remarkable

moisture resistance and low permeability constant, it is an excellent choice for any d-c circuit insulation where moisture may be present.

Results of a research under way in Rome Cable Laboratory show Polyethylene to be outstanding over all other insulations when subjected to d-c moisture test. Conventional Polyethylene burns readily but no more so than any ordinary rubber compound, so that this characteristic may or may not be objectionable. Flame-retardant Polyethylene compounds have been recently developed which will correct this property. Polyethylene is considered satisfactory for installation indoors, overhead, or in the earth. Industry specifications for Polyethylene insulated cables are now available.

Nylon thermoplastic is used either

Pipe Line Applications of Wire and Cable Brief suggestions for cost savings and special applications

Pumping Stations

Motors requiring a distribution voltage of 1200 are frequently required. Although not generally listed in manufacturers' catalogs, there is an IEEE-ASTM rating classification of 2000v that would be appropriate for such wiring. Therefore, a 2000-volt rated cable consisting of some residue insulation with an outer Neoprene sheath—either as single or multiple conductor assembly is suggested.

Cathodic Protection

For underground cable connections between the electrodes and pipe line, a satisfactory and economical solution is heavy wall TW. A satisfactory alternate type is so-called type RH underground cable rated at 600 v. Either may be buried directly in the ground.

Pipe Line Telephone

A most economical and satisfactory, multi-paired cable design utilizing thin walls of Polyethylene, shielding, and overall synthetic sheath has been developed for either overhead or underground application.

Pulling Compounds

For Neoprene sheathed cables a lubricant consisting of soap flakes and water has been found very effective. For TW type insulations a surface lubricant is ordinarily applied at the factory. However, paraffin or "Albany" grease serves where further lubrication may be needed. Polyethylene is practically self-lubricating—ordinary water should provide adequate lubrication for most jobs.

Direct Buried Cables

Install at least 18 in. below the ground. If unshielded, keep cables

spaced a few inches in the trench and a bare counterpoise wire installed in the same trench will provide some lightning protection.

Shielded Power Cables

Where expense is considered too great, consider either conventional lead sheathed or thermoplastic jackets (instead of Neoprene) over the shield.

Large Conductors

Whenever space permits, the paralleling of conductors is good engineering and economical. One large company has reported they try to limit any maximum conductor size to 500 MCM. For example, substitution of paralleled 300 MCM Type RH conductors will provide the same current-carrying capacity as single conductor 1000 MCM type RH—at a cost saving (factor) of 25 per cent and a further substantial saving of copper.

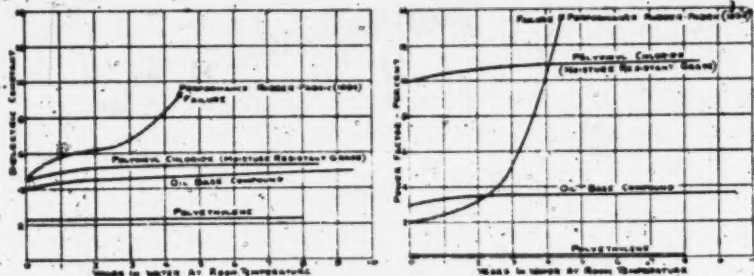
Multi versus Single Conductor Power Cables

Whenever terminal and roadway space permits, three single conductor power cables have certain mechanical and economic advantages over a three conductor cable. On most 600 volt sizes this means at least a 30 per cent saving in cable cost plus easier splicing, repairing, fault location, etc., for the single conductor cable which, incidentally, also incorporates full sheath protection throughout the circuit length.

Cable Specifications

Whenever possible it is recommended that standard industry specifications be adhered to. Special requirements or "trick" tests usually mean increased costs, restricted supply, and delivery delays.

[fol. 5722]



FIGS. 1 AND 2. LONG time electrical data describing moisture resistance of cable insulation

an extruded sheathing material or as a fabric for braid coverings. It is relatively high in cost and its proposed end uses should be carefully reviewed before deciding upon its application. Its primary feature as a cable covering is its unusually high resistance to mechanical abrasion and crushing. So far, Nylon has not been used for primary insulation due to inherent poor electrical properties and moisture resistance.

Polytetrafluoroethylene (Teflon) and fluorinated ethylene (Fluorothene and Kel-F) are under development as cable insulations. Although present costs are prohibitive, the anticipated advantages of these materials will undoubtedly find many applications in the future. Their almost complete resistance to all solvents, chemicals, flame, water, etc., added to their excellent electrical and heat characteristics certainly present an attractive picture for hazardous wiring jobs.

One of the major enemies of cable insulation in the past has been water and this problem has undoubtedly precluded use in many underground or wet applications. Figs. 1 and 2, how-

over, present data on long-time tests that illustrate the progress that has been made in making our modern insulations substantially waterproof so that we can now confidently select a proper insulation without a lead sheath for wet locations.

Laboratory Testing

Our knowledge and best uses for these materials are mainly obtained from intelligent testing and development of the right kind of tests has been a problem in itself. Insofar as non-metallic sheathed cable is concerned it has been found that resistance to moisture is probably the greatest determining factor for a successful service life.

Accordingly, a large part of laboratory research over the past 15 years has been devoted to development of a suitable test to prove whether or not a cable should be used in a wet location.

It has been long since determined that it is not necessarily a question of how much water is absorbed, but of much greater significance is the location of the absorbed water in the insulation, and this can only be established by electrical test methods. A

test has now been developed to determine the electrical stability of insulations in water and, recently, has been adopted as a Standard by ASTM and IPCEA.

Another somewhat new and highly useful test for cables rated at 3000 v and higher is called the corona-level test. This test serves as a vital control of quality by measuring the start of internal ionization within the cable. Since loose insulation or shields, voids, abnormal porosity, etc., might cause destructive ionization discharge at the operating voltage, it is the object of the corona-level test to detect this condition and thus reduce another failure hazard.

Cable Design and Selection

Probably the best known design utilizes a combination having about 15 years experience and consisting of a good rubber insulation with an overall Neoprene sheath. The features of such a cable as compared for instance, with a lead sheathed cable are simplicity which aids in splicing, freedom from electrolysis, light weight, low cost, and a general-purpose end use either over-

Suggested safe practice for pipe line strikes

[illegible]

[fol. 5723]



FIG. 3.



FIG. 4.

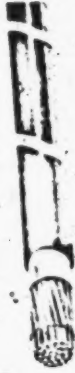


FIG. 5.

FIG. 3. 15 KV rated cable, ozone resistant insulation, metallic shielding, thermoplastic sheath.

FIG. 4. CONTROL cable — Polyethylene insulated, thermoplastic sheathed.

FIG. 5. AERIAL, telemetering cable with factory applied messenger.

head, underground, or indoors. With modern grades of insulation such a cable is almost foolproof for most 600 v power applications. Experience has shown, however, that for certain installations involving severe oil or chemical exposure that a conventional lead sheathed or suitable thermoplastic design may be preferable.

When circuit voltages over 3000 are encountered it may be desirable to incorporate a metallic shield between the insulation and sheath for protection to personnel or to eliminate failure possibility from sheath leakage and discharge or from voltage surges. Where a shielded cable (Fig. 3) is advisable for electrical reasons and where there may be considerable exposure to oil or chemicals a more economical thermoplastic sheath instead of Neoprene is suggested. This would be especially true for buried installations near or exposed to the pipe line conditions.

For many 600 v applications especially lighting, machine wiring, branch circuits, etc., a TW or PVC insulated conductor has provided satisfactory and economical service—especially for the petroleum and chemical industries. Recent trends indicate that slightly heavier than standard TW walls of a special heat-resistant PVC compound are being successfully used in many locations including direct earth burial.

Such PVC insulated conductors are not generally recommended for power circuit applications in excess of 600 v.

Polyethylene as insulation or sheath is gaining prominence rapidly and is already being used in the chemical industry for power cable insulation on cables rated up to 15 kv. The material is also ideal for low voltage d-c control circuit wiring as illustrated in Fig. 4. It is about the only satisfactory material available for high-frequency and telephone cables using Polyethylene leaded designs. In fact, multi-paired telephone cables using Polyethylene have been manufactured for installation directly in the trench with the pipe line itself. Such cables are specially constructed or custom-built for the job. Similar telephone cables can be designed for overhead use.

Overhead cable versus open-wire construction is rapidly gaining in popularity mainly because of substantially improved appearance and protection from storm outages. Aerial cable construction initially costs somewhat more than open-wire, depending upon the operating voltage but compared with underground construction costs considerably less and offers similar advantages. Almost any type of power, control, or communication cable can be so constructed as to be adaptable for aerial construction by incorporation of

built-in messengers (Fig. 5) at the cable factory or by the use of field assembled messengers.

For primary voltages up to 15 kv, aerial cable design generally consists of ozone-resistant rubber insulation with an overall corrosion-resistant shielding tape—or unshielded Neoprene jacketed designs for voltages up to 5000. For secondary (600 v) construction, a simple cable design consisting either of Neoprene or Polyethylene insulated conductors wrapped around a bare neutral-messenger provides a simple, low cost arrangement. Standard hardware is available for any of these overhead designs.

Underground cable types generally include shielded, Neoprene or Thermoplastic sheathed, ozone-resistant rubber insulated conductors for voltages over 3000 (Fig. 3)—and either special thermoplastic or rubber insulated Neoprene jacketed type RR cable for 600 v applications. Any of these cables may be utilized directly buried in the earth.

Aluminum Conductors

The subject of aluminum conductors has been "on and off" for the past several years, depending upon metal availability and economics. For overhead applications involving weather-proof line wire or low voltage secondary distribution cables, the light weight and economic advantages of aluminum present such an attractive picture that its continued and extended use for such purposes seems assured. The only real problem has been the development of satisfactory connectors where good progress is rapidly being made.

For underground and other insulated cable applications the future of aluminum is somewhat doubtful. There are practically no technical advantages and the economics are deceiving. For example, the electrical equivalent in aluminum which is two AWG sizes larger than its copper equivalent means that where insulated cable is concerned an increased volume of insulation and coverings must be used. This added expense coupled with the necessity of larger raceways, more expensive connections, etc., may easily offset any apparent original savings in conductor material particularly for voltages in excess of 600. Wherever space considerations are of importance, the use of aluminum may be almost prohibitive due to increased size.

Aluminum to copper connections in small branch circuit sizes of insulated conductors require special devices and skill that if not closely adhered to, might cause difficulty. The use of suitable compression type connectors on the larger feeder sizes has been satisfactorily established.

[fol. 5724] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 372

January 4, 1955.

A. D. R. Fraser

R. A. Schatzel

Aluminum vs. Copper

There are three areas where Aluminum and Copper may compete in wire manufacture:

a) Bare. Transmission and Overhead insulated wire inland away from the sea coast. Here aluminum because of its cost, lighter weight and, when reinforced with steel, its strength has the advantage. Aluminum for many years has become the principal metal used in high-voltage transmission, and with the solution of some joining problems, is becoming increasingly important in lower voltage applications. Because of the number of taps and connections at low voltage the cost and reliability of these when aluminum is considered is still a hindrance.

Along the sea coast, because of corrosion by salt water, copper is still favored.

b) Areas where copper and aluminum may both be used, depending on cost. These include industrial uses as in coils, as a part of transformers in wiring of industrial buildings, and underground. These are all insulated conductors. Aluminum cables are larger and require more insulation. The cost of termination is greater and in some cases corrosion is a factor. The margin in cost when installation is considered, increased cost of conduit because of size, and the greater care in termination, is not so great and only when copper is in short supply will aluminum be favored. However, here is a field of challenge and competition. There is no reason to believe aluminum will make progress, but copper will continue to be favored when available at reasonable cost because of its superior properties and reliability.

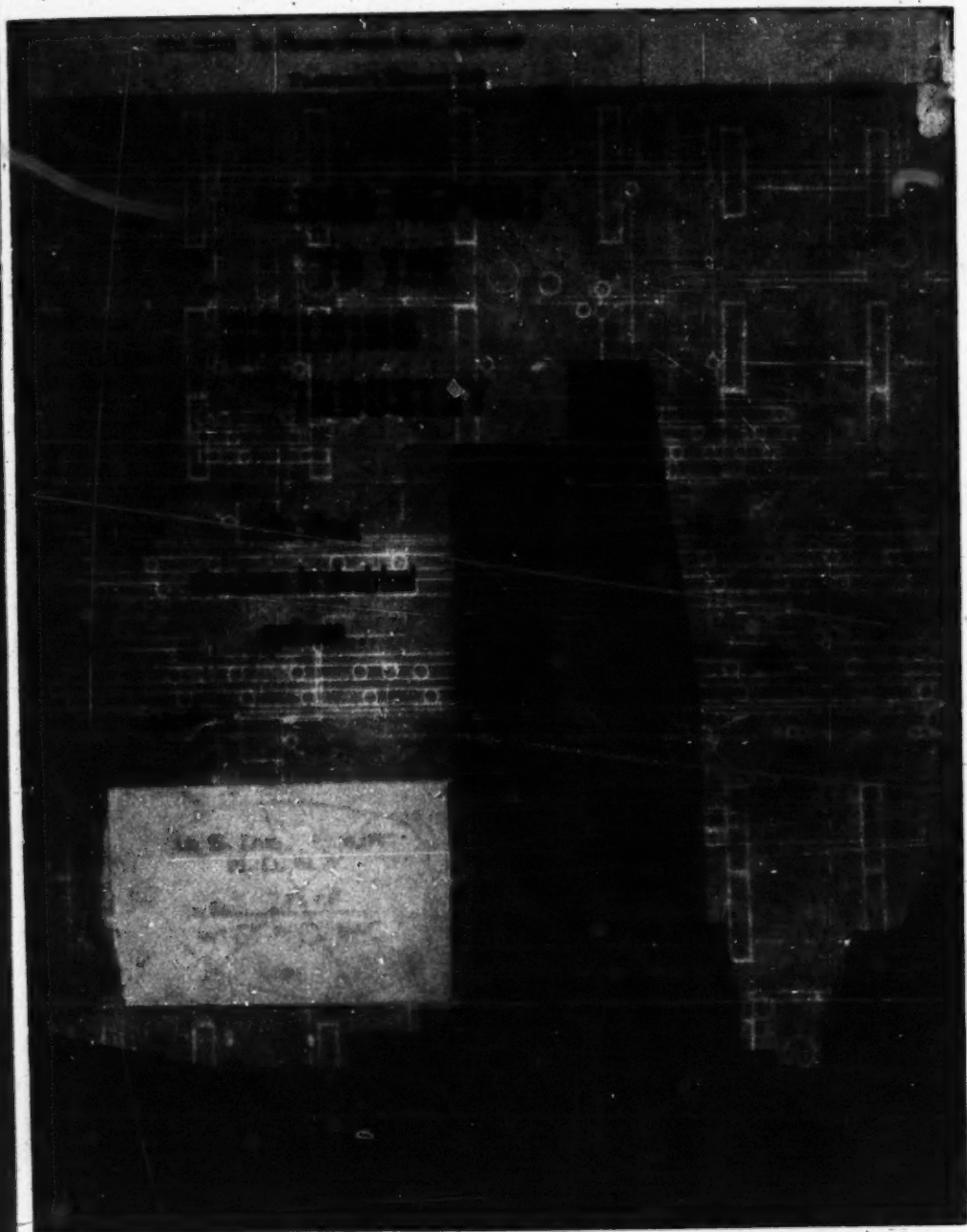
c) Areas where space is a predominant factor, and ease of working and flexibility are important. Here aluminum is at a disadvantage. The use of aluminum in a motor

requires a larger frame. Termination in a rotating machine introduces mechanical problems of major difficulty. The use of cable in city ducts for network supply of power to cities. Ducts are overcrowded and space at a premium. Aluminum would only apply in an emergency. The rewiring of commercial and public buildings. The cost of taking out old and installing new larger conduit is greater than the cost of wire. Some relief is possible with new insulations to install larger size of copper. Aluminum is not a solution. [fol. 5725] Aluminum is a supplement to copper. It will never supplant copper. Both are needed if in the next ten years we are to completely duplicate the entire electrical system of the country as it is now indicated we will.

R. A. Schatzel.

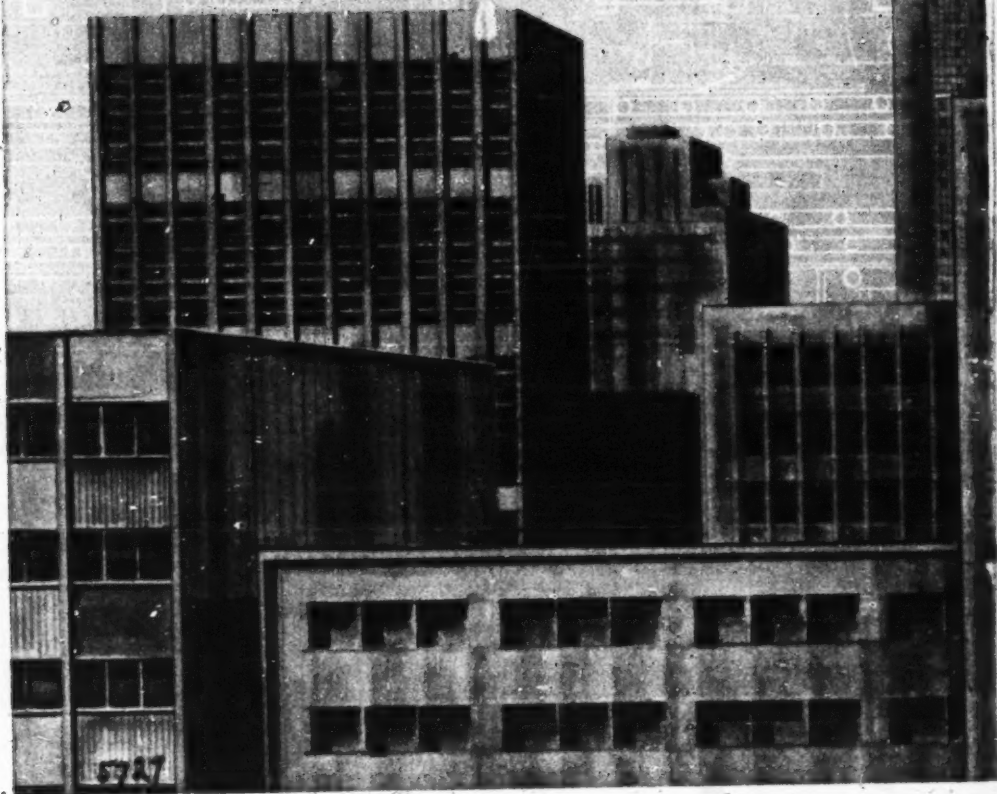
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[fol. 572]





THE REASON FOR THIS REPORT

As aluminum is passing its 70th birthday, electrical applications of aluminum are moving down from overhead power lines into plants, offices, monumental buildings, and a host of utility structures. To determine how much knowledge of and interest in electrical uses of aluminum exists in the building industry—uses both for conductor and nonconductor applications—Alcoa retained the nationally known firm of Edward E. Ashley, consulting engineers. They were asked to survey current trends in aluminum utilization in the industry. This booklet is in large part based on the comprehensive report made to Alcoa by the Ashley organization.

[fol. 5729]

BACKGROUND

Today's ascendancy of aluminum for electrical applications, as well as many others, dates from the end of World War II. During World War II, aluminum was commandeered by the United States Government, as was copper, for the most critical war needs. Both metals were in demand for non-electrical uses—aircraft, shell cases, etc. As a result, silver was taken from government storage vaults and used for bus conductors and transformer windings. At the end of the war, the silver was remelted and returned, and the battle of aluminum vs copper was resumed.

A number of aluminum applications were introduced or reviewed, and today we see aluminum either predominant or running a close second to copper in such uses as overhead transmission, primary and secondary distribution, busway systems, substation conductors, and light and heavy industrial bus runs. Many of the applications, such as aluminum lamp bases, countless small parts in telephone sets and lighting fixtures, have become commonplace. Aluminum conduit, aluminum building wire and cable, aluminum cable trays and aluminum switchgear enclosures are less conspicuous, but have met with wide acceptance—all because of one outstanding common denominator: savings in hard money.

There are two specific reasons for aluminum's rapid emergence and dominance in certain electrical fields . . . price and availability. Fig. 2 illustrates aluminum's remarkable and continuing increase in production. Since 1946, aluminum production has quadrupled, while copper has yet to reattain its World War II peak. In 1964, aluminum production exceeded that of copper for the first time. It appears likely to continue its lead by ever greater margins.

Consider the following short but essentially accurate picture of copper vs aluminum during the past

60 years: The fluctuations in the supply and demand of copper, with correspondingly violent fluctuations in price, have plagued the copper supplier and consumer alike for the better part of the twentieth century. The supply and demand of aluminum, and corresponding prices on the other hand, have been essentially stable. The reasons? Rather simple.

Copper was a well-established metal with a heritage running through many centuries. It was produced by several competing interests. Technological advances were creditable. In recent years, long-time price trends appear to be ever upward—irrespective of inflation. This is due to diminishing supplies of high grade copper ores, mainly in the United States.

The aluminum picture differs greatly from that of copper. Aluminum was a "newcomer" to the metal industry and was considered an upstart by some. Aluminum is the most common metal in the earth's crust. The rise in the use of aluminum is due to maintenance of a stable price structure and to research and developmental programs. Today's user of aluminum sees a very clear picture of abundant supply and a stable market price. Fig. 3 shows that aluminum has maintained a fairly steady rate of price change, while other metals have shown price fluctuations of considerable magnitude.

Aluminum's progress may also be linked with its inherent physical, electrical, mechanical and nuclear properties. These properties are responsible for tipping the balance to aluminum in the face of stiff competition with copper and other materials.

The following sections of this report outline the areas where aluminum electrical products have been successfully applied. It is hoped that those responsible for the design, inspection and construction of buildings may find information here which can be applied to specific applications, and which will contribute to the improvement of electrical systems in all types of structures.

[fol. 5730]

Fig. 7—Here is a view of the aluminum bus system at Alcoa's smelting plant No. 3, Niagara Falls, N. Y. The bus was installed in 1898 and gave continuous service until plant was dismantled in 1949.

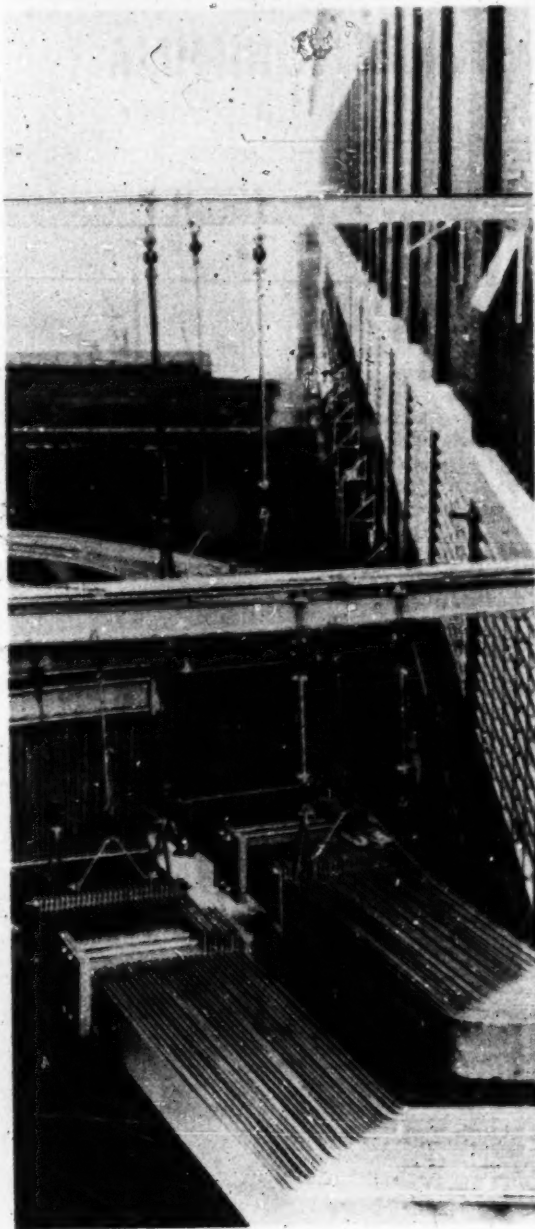
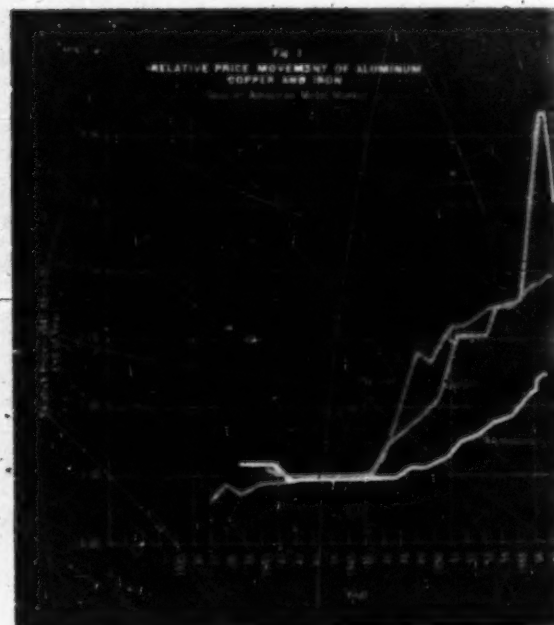
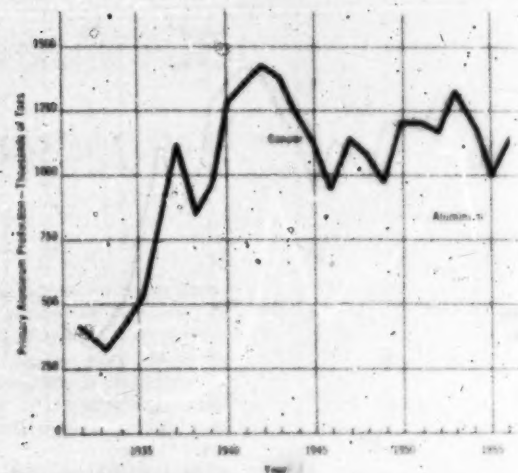


Fig. 5
PRODUCTION OF PRIMARY ALUMINUM AND COPPER IN THE UNITED STATES
Source: U.S. Bureau of Mines; American Metal Market



THE ALCOA BUILDING

... SHOWCASE FOR

ALUMINUM ELECTRICAL PRODUCTS

During 1960, the eyes of the building industry were on Pittsburgh, where the Alcoa Building—an entirely new kind of skyscraper—was under construction. From its curtain wall skin to the electrical backbone of riser bus deep within its core, the Alcoa Building was an innovation in aluminum.

This metal was utilized in every practicable application here to show its versatility and to demonstrate its major role in commercial buildings.

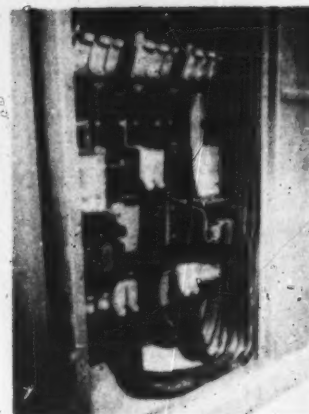
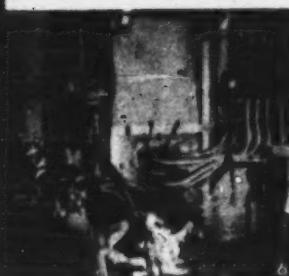
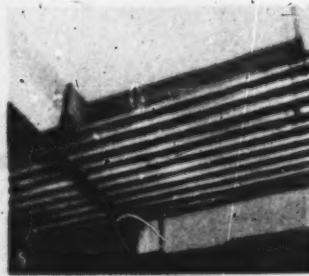
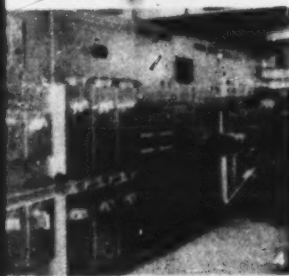
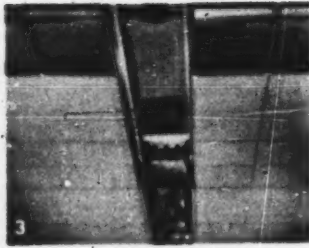
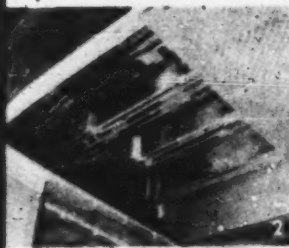
The Alcoa Building is a significant undertaking to all in the industry, especially to those associated with the design and installation of building electrical systems. The structure is a veritable showcase for aluminum in virtually every type of electrical component—and a challenge to skeptics who questioned the extensive use of this metal in electrical systems.

Today, there is probably no major commercial structure in the world that has used aluminum more effectively and economically in its electrical systems. The Alcoa Building was the first skyscraper to use aluminum wiring exclusively—first to use rigid aluminum conduit exclusively—and first to use all-aluminum lighting fixtures designed as an integral part of the ceiling heating and cooling system.

In spite of outside skepticism, Alcoa felt confident this aluminum electrical system would prove its success over the years ... and it did.

Further reference to specific electrical components in this building will be made in the appropriate sections of this report. Meanwhile, let us explore other commercial and industrial structures where aluminum electrical products are being proved practical, efficient and economical.

[fol. 5732]



Alcoa's drawing shows one view of extruded aluminum sections for the Alcoa Building. Two of these beam-panels are shown completely separated electrically serve the building.

Overhead bus bar connecting transformers to each floor.

Here is one of the many aluminum (extruded) beam-panels featured in the Alcoa Building. Most, too, is specially designed with slots that contain the cooling grid of aluminum pipe to carry away heat generated by the lights.

This main switchboard in the first basement controls the power supply for 35 floors. Janitor closets. All panels are made of aluminum.

Top run of 24 in. aluminum conductors feeds the branch circuits in the building.

9 inch, 700,000 cu. aluminum cable transfer to bus conductors for power lines to 3,000,000 cu. aluminum ring bus.

Insulated aluminum cables and terminals at the supply power to a 500-hp refrigeration compressor located in the building's sub-basement.

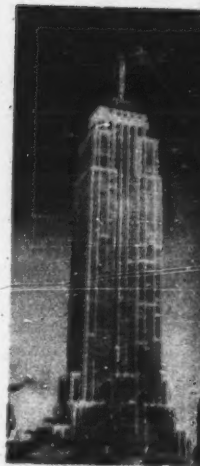
[60, 5733]

ALUMINUM ELECTRICAL PRODUCTS AT WORK IN COMMERCIAL BUILDINGS

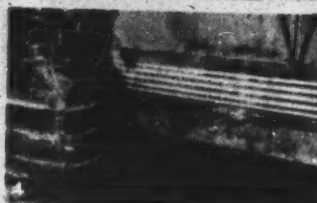
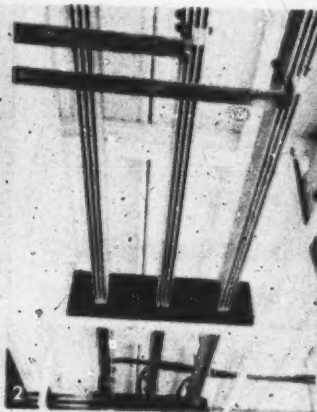
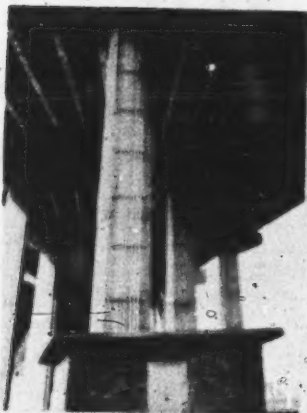
The group of buildings surveyed by the Ashley firm includes some of the nation's major commercial construction projects. In each, aluminum's lightness, easy-working properties, and electrical characteristics provided economical and efficient installations of busways, conduit and other electrical components.

It is interesting to note that many of the buildings in this group are located in New York City, an area where commercial electrical codes are probably as stringent as any in the nation. Other buildings not shown here are listed separately. In many cases, more than one building of a particular company contains aluminum electrical products.

AMERICAN MACHINE & FOUNDRY COMPANY • BELL TELEPHONE COMPANY • CHRYSLER CORPORATION • DIPLOMAT HOTEL, MIAMI, FLA. • E. I. DU PONT DE NEMOURS • FORD MOTOR COMPANY • GENERAL MOTORS CORPORATION • HALLMARK CARS • ILLINOIS INST. OF TECHNOLOGY METALS RESEARCH BUILDING • JAY MANUFACTURING COMPANY • KENNAWAP APARTMENTS, PITTSBURGH, PA. • MURCHISON TOWER BUILDING, DENVER, COLO. • NEW YORK CENTRAL RAILROAD • OWENS ILLINOIS GLASS COMPANY • PITTSBURGH PLATE GLASS COMPANY • REMINGTON RAND DIVISION • REMURY RAND CORPORATION • ROCKWELL BUILDING, NEW YORK CITY • TIMKEN ROLLER BEARING COMPANY • UNION TRUST BUILDING, PITTSBURGH, PA. • WACOVIA BANK BUILDING, CHARLOTTE, N. C. • L. A. YOUNG SPRING & WIRE COMPANY



Empire State Building,
New York, N. Y.



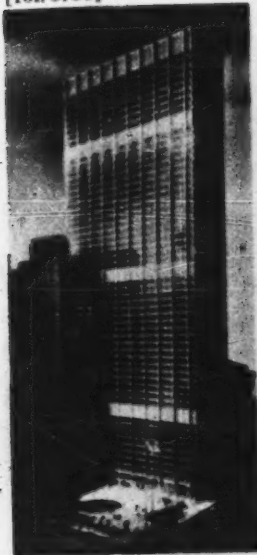
1. West Wifman Bridge, Philadelphia, Pa. The aluminum conduit here was used to save weight and to withstand all the abuses of an outside installation.

2. Remury Apartments, Pittsburgh, Pa. Electrical conduit and air conditioning almost doubled the load requirements originally estimated for this building. Changing from conduit and cable to an aluminum busway system permitted the increased load without appreciably increasing the original estimated system cost.

3. The aluminum bus was installed in 1937 in the Wadsworth Paper Products Company, St. Paul, Minn. Notice the copper tap-offs at the top of the photo which show effects of the corrosive atmosphere inherent in this industry.

4. Aluminum conduit runs above a 16-in. sewage line in the Clarks Road Sewage Treatment Plant, Highland Park, Ill. Aluminum withstands the corrosive atmosphere common in this type of application.

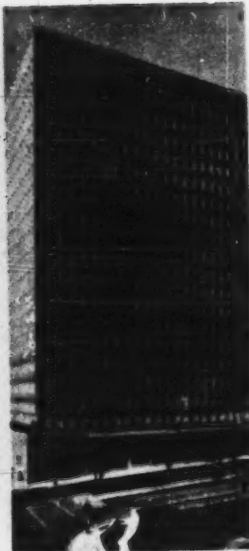
[fol. 5734]



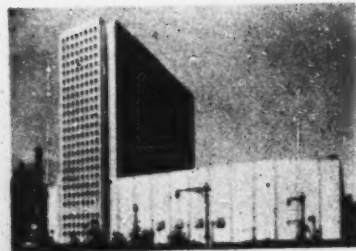
Chase Manhattan Bank,
New York, N. Y. (under construction)



Seacny-Mobil Building,
New York, N. Y.



Commercial Credit Building,
Baltimore, Md.



New York Coliseum,
New York, N. Y.



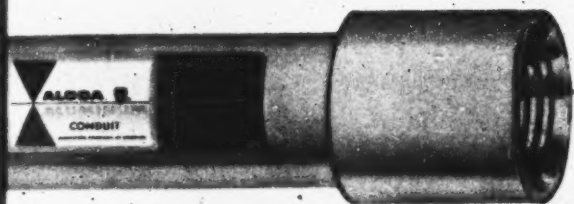
Bank of the Southwest,
Houston, Tex.

INDUSTRIAL BUILDINGS AND SPECIAL INSTALLATIONS

As a rule, construction materials for industrial buildings and other special structures are exposed to a greater degree of abuse than those found in commercial buildings. Many process industries and fabricating plants, for example, have atmospheres which are inherently corrosive, dusty or humid.

Most of the aluminum electrical products we know today grew up in such environments . . . areas where other metals might have failed. Aluminum resists corrosive acid fumes in chemical and sewage disposal plants, shrugs off the effects of steam and moisture in dairies and other areas of high humidity. And outside, on bridges, in substations . . . even on the undersides of buses and highway trailers . . . aluminum comes through in all types of weather like the proverbial postman. Small wonder, then, that aluminum electrical components were selected for the installations shown here and for those on the previous page.

Now that we have seen where aluminum electrical systems are at work, let us examine each component in the system more closely. Let's look at facts.



ALUMINUM CONDUIT

Alcoa aluminum has had approval of Underwriters' Laboratories, Inc., for use as rigid conduit since 1922. Development of new alloys over the years has permitted manufacture by an extrusion process, resulting in an improved product at lower cost, with ample strength for use as an electrical raceway.

Because of aluminum's lightness, conduit installation costs in many applications are less than those for steel. Size for size, a piece of steel conduit is nearly three times as heavy as a similar piece in aluminum. Lighter weight permits more rapid installation, helps reduce worker fatigue, and is a decided benefit in hazardous or difficult situations where very high ceilings or high vertical exterior risers are encountered. Fig. 1 shows the comparative weights of aluminum and steel conduit feeders.

For a large group of feeders in conduit, the number of required supports will generally be proportional to the weight. Here, very definite installation savings can accrue from an aluminum conduit installation. Fig. 2 compares the support requirements of large-size aluminum and steel conduits, showing that fewer supports are necessary with aluminum.

To compare the installation requirements of steel and aluminum conduit, a set of figures was secured representing average installation man-hours per 100 ft. in diameter sizes from $\frac{1}{2}$ in. to 4 in. These figures are based on a typical project and were verified with several large electrical contractors before publication. The results can be seen in Fig. 3.

The "possible" line in this graph was derived from a poll of several hundred leading electrical contractors across the nation who felt that the installation time shown could be achieved by using experienced and knowledgeable mechanics. Most contractors polled, who had worked with aluminum conduit, stated they had realized appreciable installation savings. The average savings ran about 10 to 15 per cent, but some contractors indicated savings of as much as 20 to 40 per cent.

Aluminum wards off most corrosive elements that damage other types of metallic conduit. Ample proof of aluminum's resistance to corrosion has been cited in numerous exposure and laboratory tests, and by countless applications in the process industries.

Aluminum conduit can be safely installed in concrete. This is proved by the successful use of aluminum for handrails, grilles, structural elements, building facing, terrazzo strips and pipes. These can be completely buried in concrete or may be partially covered. The latter condition is more often subject to corrosive attack than the complete burial.

[col. 3736]

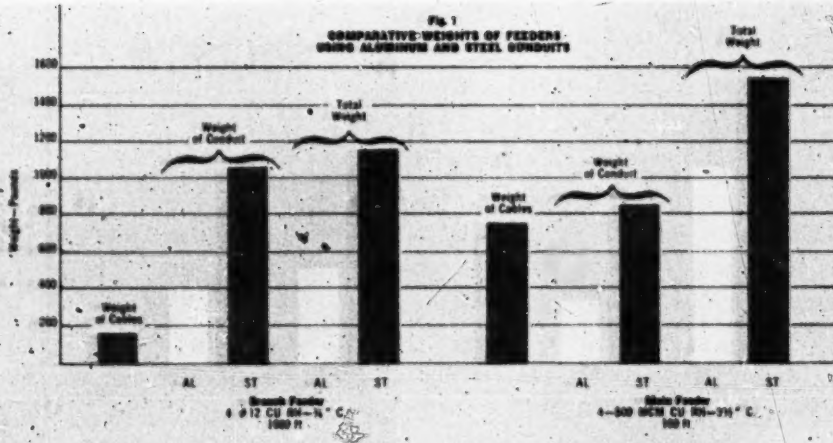
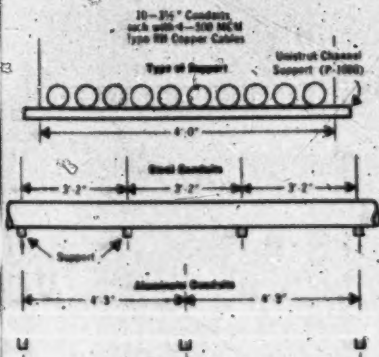


Fig. 2
COMPARATIVE SUPPORT REQUIREMENTS
OF LARGE SIZE ALUMINUM AND STEEL CONDUITS
FOR SAME ALLOWABLE DEFLECTION

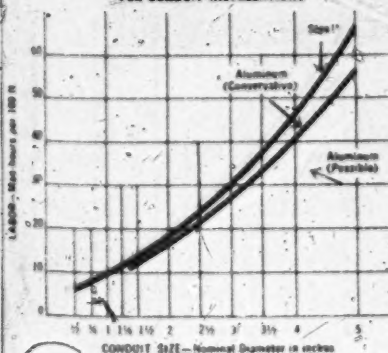


Extensive testing also leads to the general conclusion that aluminum is compatible with the common alkaline building materials. The chemical by-products and hydroxides of calcium, magnesium and ammonium in building products cause an initial mild surface attack which upon subsequent curing and aging develops into a self-limiting protective film, thus preventing further corrosive action.

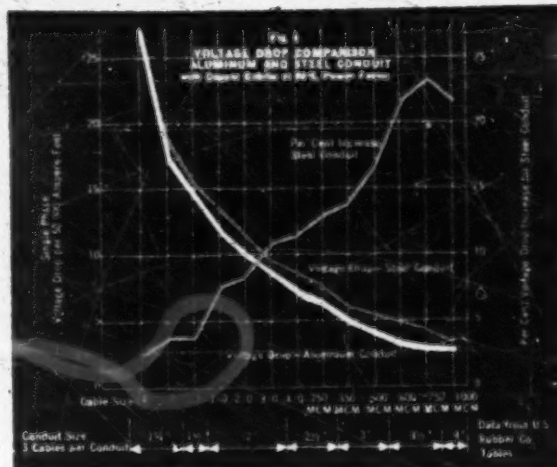
Since aluminum is nonmagnetic, it is not subject to magnetically induced energy losses. Therefore, voltage drop is reduced, and each conductor in a single-phase or polyphase system can be enclosed in a separate conduit, regardless of the electrical load. Installation of electrical equipment with widely spread terminals is thus simplified. Fig. 4 compares voltage drop for the common range of copper cable sizes in aluminum and steel conduits. It can be seen here that feeders in aluminum conduit have a lower voltage drop throughout the entire range of cable sizes.

Other advantages of aluminum conduit over that of steel include a nonsparking property that is particularly important in explosive environments, and a handsome appearance that counts heavily in areas where a modern, clean-looking installation is desired.

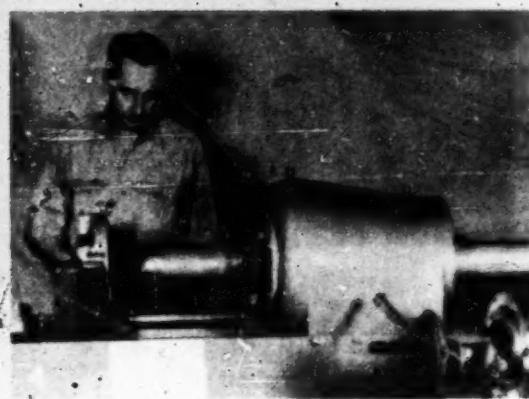
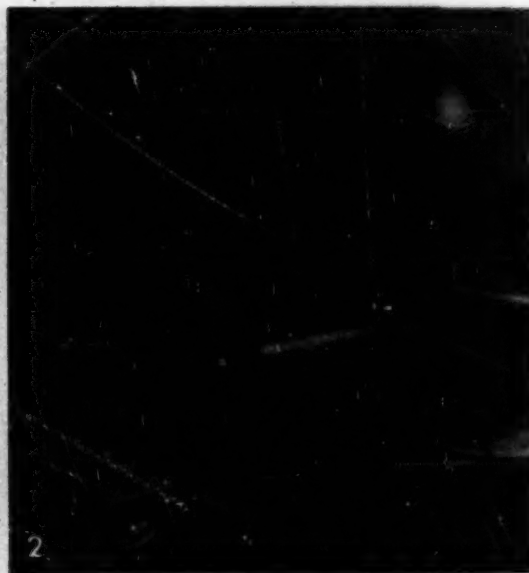
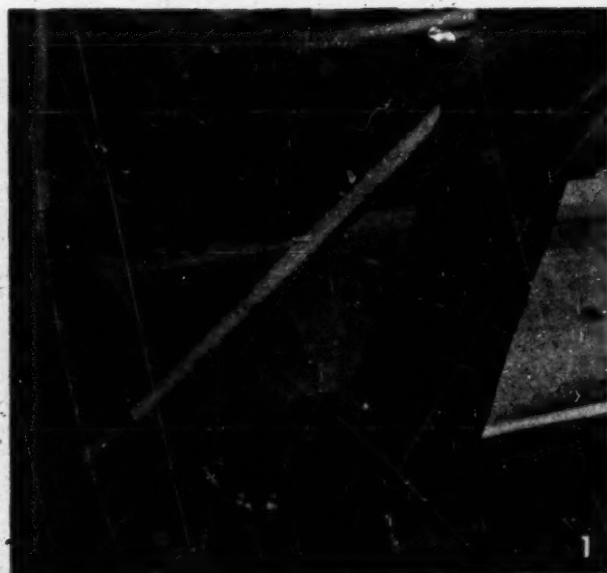
Fig. 3
AVERAGE LABOR REQUIREMENTS
FOR CONDUIT INSTALLATIONS



From data by H. J. Farnham, G. E. Co., 1944



WORKING PROPERTIES OF ALUMINUM CONDUIT



1-2. BENDING

Aluminum conduit is far easier to bend than conventional conduit, as less force is required for a comparable bend. Bends can be made "on the nose," since there is no appreciable springiness, as in steel. Most contractors use the same bending tools for steel and aluminum conduit, with equally good results. EMT benders can be used for the smaller conduit sizes, while rigid conduit benders are excellent for the larger sizes.

3. CUTTING

Aluminum conduit is easier to cut than steel conduit. The smaller sizes are easily cut with a hacksaw, while modern power cut-off equipment can be used for the larger sizes.

4. THREADING

Aluminum conduit is easily threaded if good conventional tools are used; but the use of dull tools or broken dies may cause serious difficulties. The use of sharp dies is good practice with aluminum as with any other metal. If desired, dies can be purchased with a rake of about 35 degrees to make them self-cleaning. Almost any conventional cutting oil can be used, although the better grade oils have a viscosity of approximately 150 ssu at 100 F and are fortified with sulfur and/or chlorine additives.

5. JOINING

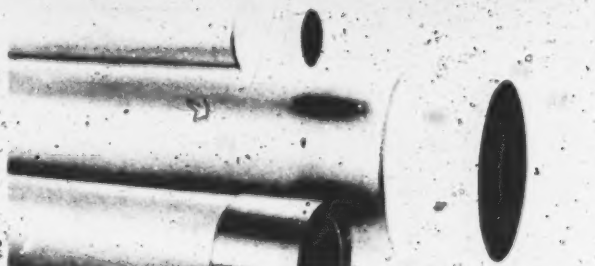
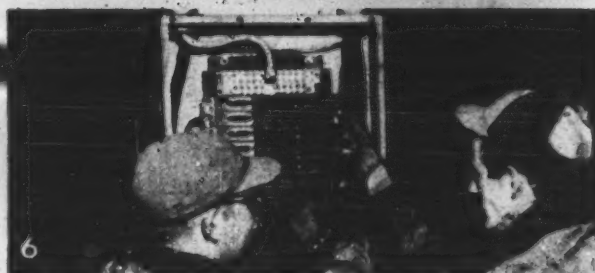
Again, the same practices apply to aluminum as to steel. A typical thread lubricant consists of a mixture of zinc dust and petroleum jelly, or a heavy cup grease containing about 25 per cent graphite.

6. WIREPULLING

A special coating which is provided on the interior walls of Alcoa aluminum conduit makes wirepulling exceptionally easy. Terminal balls should be used on the ends of fish tapes to prevent sharp tape ends from digging into the conduit at bends, or catching on inadequately closed joints. If additional lubrication is required, as occasionally happens, talc or powdered soapstone is recommended. Some difficulties have been reported here and there because of failure to follow these practices.

7. STORING

Alcoa aluminum conduit is supplied with improved protective caps for threaded ends. Caps are color coded to provide fast size identification, simplifying conduit storage and handling.



TYPICAL ALUMINUM CONDUIT INSTALLATIONS



THE ALCOA BUILDING, PITTSBURGH, PA.

It would seem appropriate that Alcoa's home headquarters should have made extensive use of aluminum. Yet, the selection of this metal reflected more than a manufacturer's natural preference for his own product. This is especially true of the aluminum conduit installation in the building, where aluminum was selected over steel because of installation and maintenance economies. The electrical contractor for the project reported installation savings were especially marked for conduit 1½ in. and up. He compares the aluminum conduit with steel as follows:

Cutting

"Same"

Bending

"Easier"

Threading

"Same"

Installing

"Tremendously easier"

[Vol. 5740]

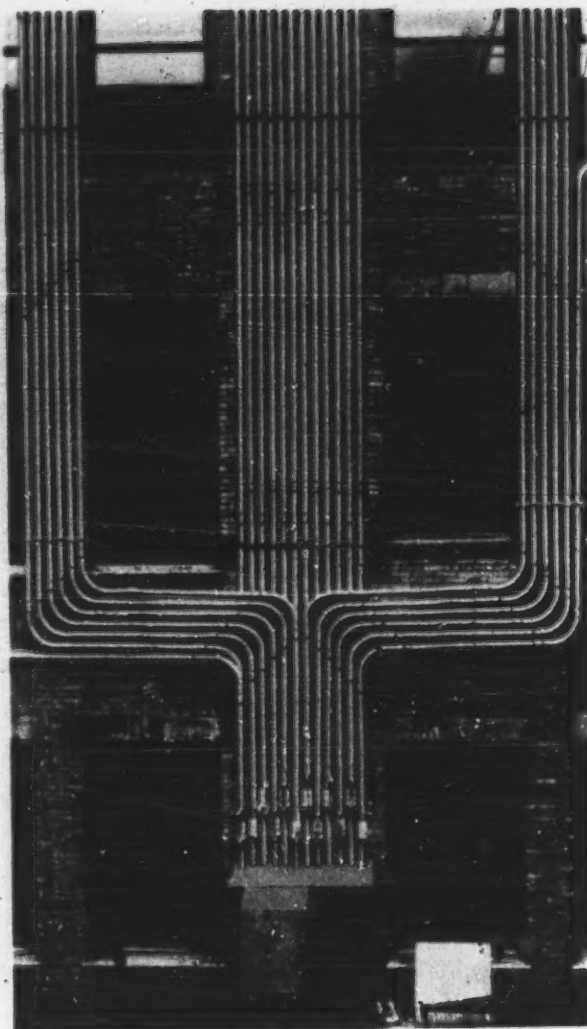
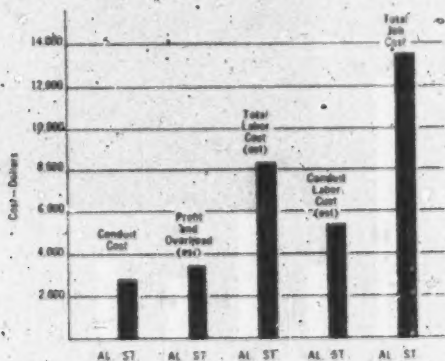


EBASCO SERVICES BUILDING, NEW YORK, N. Y.

Here's an interesting and instructive aluminum conduit installation erected early in 1955, and in full service today. It consists of several 2½-in. conduit risers running up the exterior wall of this 26-story building. Aluminum conduit was considered ideal for this project because it was desired to utilize existing shutter brackets as supports. Steel conduit would have been too heavy and too difficult to maintain.

Even though this installation had to be made from two simultaneously rigged painter's scaffolds, the advantages offered by light weight, easy-handling aluminum sections made it possible for the contractor to make substantial savings.

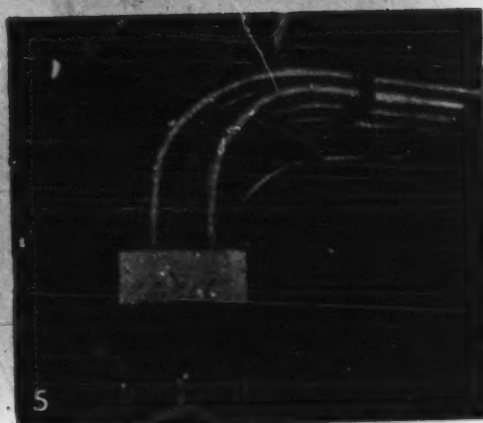
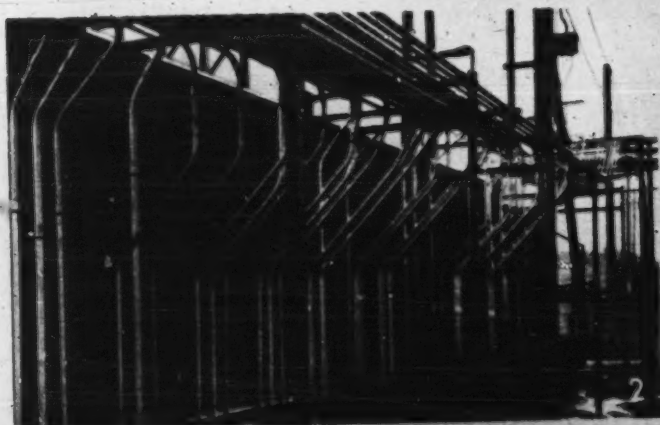
**FIG. 1
COMPARATIVE COSTS OF A CONDUIT INSTALLATION
ALUMINUM CONDUIT vs STEEL CONDUIT**



The unqualified success of the initial job prompted the installation of additional 2½-in. risers two years later. The contractor prepared two estimates for the addition—\$13,500 for steel, and \$12,150 for aluminum—or a 10 per cent saving with aluminum. Fig. 5 graphically shows these comparative estimates.

This particular project illustrates an excellent and economical way to increase the electrical capacity of large, inadequately wired older buildings, especially where inner shaft space is lacking, and where it is inconvenient and costly to break through multiple floor slabs. This situation is becoming more common with ever-increasing air-conditioning and lighting demands on major office buildings.

[fol. 5741]



TYPICAL ALUMINUM CONDUIT INSTALLATIONS

THE MANHATTAN BANK BUILDING, NEW YORK, N. Y.

competitive bidding, aluminum conduit was used here for all major electrical raceways. Going lower Manhattan, this new 60-story structure is a prime example of the installation economies that can be obtained with aluminum conduit.

ROCKWELL CHEMICAL CO., PITTSBURGH, KAN.

Aluminum conduit is usually specified for difficult conditions. Good examples are chemical plants with their strongly corrosive environments.

DAVENPORT PLANT, DAVENPORT, IOWA

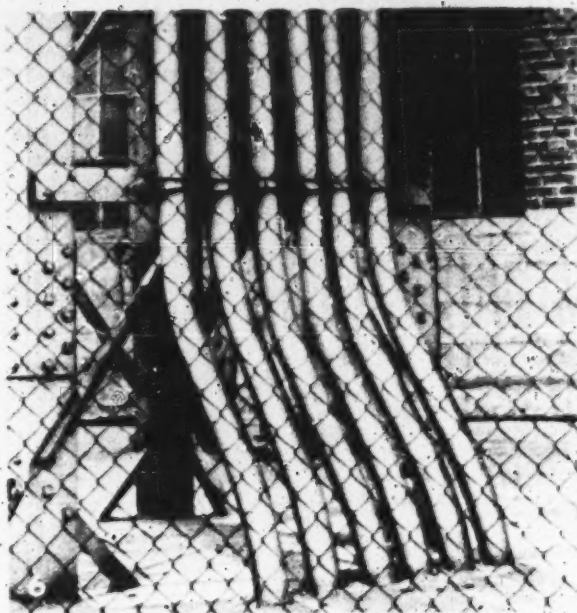
is another aluminum conduit installation. The magnetic features of aluminum conduit raceway provided lower reactance losses on heavy capacity circuits. Electricians on the job said they enjoyed working with aluminum. They noted that less exertion was required because the aluminum cable and conduit were easier to transport and handle, especially on overhead work. Aluminum was found easier to cut, bend and thread than steel. Standard pipe dies were used on the larger size of conduit; larger ones were reground with an increased "hook," or rake, to make them bending.

STEEL PLANT

Aluminum conduit is shown here in a steel plant where phase separation was necessary. Since aluminum conduit is nonmagnetic, it was possible to run the phase wires in separate conduits.

STATION

In a substation, aluminum conduit is imbedded in concrete pad. This installation has been in use since 1939.



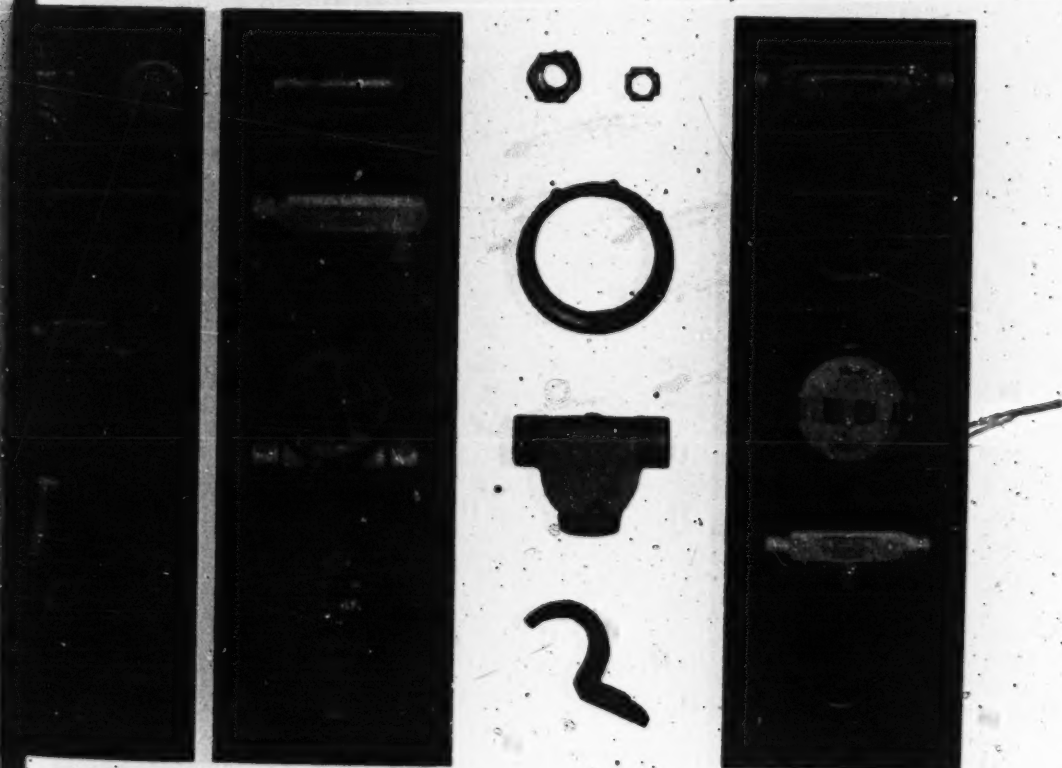
Aluminum conduit has given excellent performance in other installations of the following types:

- | | |
|--------------------------------|---------------------------|
| Airports | Petrochemical Plants |
| Breweries | Pulp and Paper Mills |
| Canneries | Railroads |
| Dairies | Refineries |
| Department Stores | Rubber Processing Plants |
| Distilleries | Seacoast Locations |
| Docks | Sewage Treatment Plants |
| Electrical Generation Stations | Shore Resorts |
| Floodlighting | Soap Manufacturing Plants |
| Ice Cream Plants | Steel Mills |
| Industrial Buildings | Subways |
| Laundries | Textile Mills |
| Marine Field in General | Tunnels |
| Mail Packing Plants | Underground Workings |
| Mines | Water Purification Plants |

[fol. 5743]

CONDUIT FITTINGS

Shown here is a selection of aluminum fittings made by several manufacturers. One major manufacturer now produces virtually every item in his catalog in aluminum as well as cast iron. Another produces his entire line of fittings, receptacles and fixtures in aluminum only. Moreover, in most cases, there is no premium for aluminum fittings.



[col. 5744]

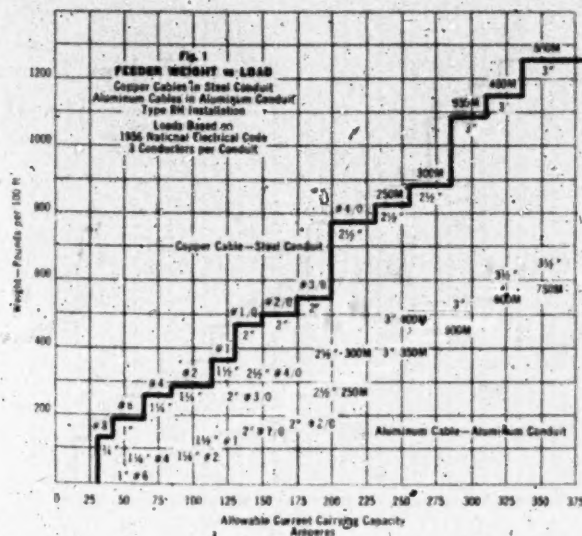
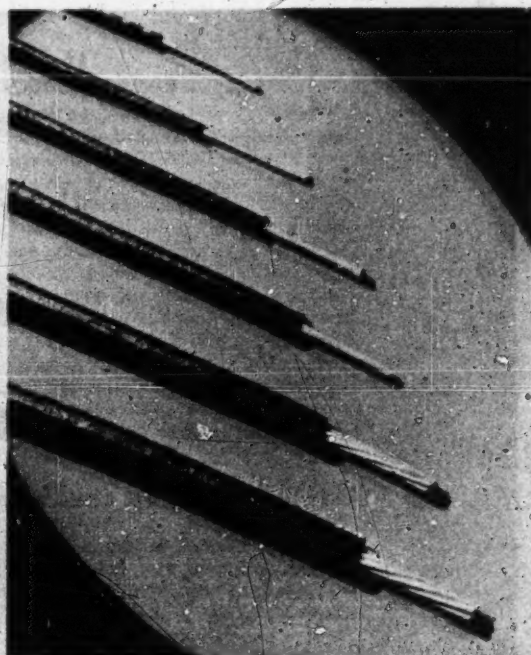
ALUMINUM WIRE AND CABLE

Aluminum cable dates back to the turn of the century, when it was first used in transmission and distribution lines. There it proved its reliability under electrical, corrosive and mechanical conditions far more extreme than encountered in typical office or industrial installations.

In more recent years, insulated aluminum wire and cable have appeared in commercial and industrial buildings, where they again performed satisfactorily under all types of conditions. Aluminum branch wiring, for example, has been particularly applicable and economical in office buildings utilizing 277/480 volt distribution and lighting systems. Viewed on a historical basis, the increased use of these aluminum electrical conductors can be attributed to a favorable price situation.

A comparison of weight and current-carrying capacity of copper and aluminum cable in conduit is seen in Fig. 1. Here, a 3-cable feeder is plotted as a function of load in both aluminum and steel conduit.

For practical purposes, an aluminum wire is considered to have a rated current capacity approximately the same as a copper wire two gages smaller (that is, No. 8 aluminum is the same as No. 10 copper wire). Fig. 2 shows that the allowable current-carrying capacities recommended by the National Electrical Code are nearly a linear function of the conductor diameter.



Size MCM or AWG	Amperes	Size MCM or AWG	Amperes Per Cent of Same Size Copper Cable
750	445		81.6
	420		
600	385	1000	81.1
	360		
500	345	750	80.5
	335		
400	315	600	81.4
	310		
350	285	500	80.6
	270		
300	255	400	79.4
	250		
250	230	350	80.4
	220		
200	200	300	78.3
	190		
150	175	250	77.5
	165		
100	150	200	77.1
	145		
75	135	150	76.0
	130		
50	120	100	78.2
	115		
35	105	75	76.5
	100		
25	90	50	77.0
	85		
15	75	35	78.5
	70		
10	60	25	77.0
	55		
7.5	45	15	78.5
	40		
5	30	10	77.0
	25		
3.5	20	7.5	78.5
	15		
2.5	15	5	77.0
	10		
1.5	10	3.5	78.5
	7.5		
1	7.5	2.5	77.0
	6		
0.75	6	1.5	78.5
	4.5		
0.5	4.5	1	77.0
	3		
0.35	3	0.75	78.5
	2		
0.25	2	0.5	77.0
	1.5		
0.15	1.5	0.35	78.5
	1		
0.1	1	0.25	77.0
	0.75		
0.075	0.75	0.15	78.5
	0.6		
0.05	0.6	0.1	77.0
	0.45		
0.035	0.45	0.075	78.5
	0.3		
0.025	0.3	0.05	77.0
	0.2		
0.015	0.2	0.035	78.5
	0.15		
0.01	0.15	0.025	77.0
	0.1		
0.0075	0.1	0.015	78.5
	0.075		
0.005	0.075	0.01	77.0
	0.06		
0.0035	0.06	0.0075	78.5
	0.045		
0.0025	0.045	0.005	77.0
	0.03		
0.0015	0.03	0.0035	78.5
	0.02		
0.001	0.02	0.0025	77.0
	0.015		
0.00075	0.015	0.0015	78.5
	0.01		
0.0005	0.01	0.001	77.0
	0.0075		
0.00035	0.0075	0.00075	78.5
	0.006		
0.00025	0.006	0.0005	77.0
	0.0045		
0.00015	0.0045	0.00035	78.5
	0.003		
0.0001	0.003	0.00025	77.0
	0.002		
0.000075	0.002	0.00015	78.5
	0.0015		
0.00005	0.0015	0.0001	77.0
	0.001		
0.000035	0.001	0.000075	78.5
	0.00075		
0.000025	0.00075	0.00005	77.0
	0.0006		
0.000015	0.0006	0.000035	78.5
	0.00045		
0.00001	0.00045	0.000025	77.0
	0.0003		
0.0000075	0.0003	0.000015	78.5
	0.0002		
0.000005	0.0002	0.00001	77.0
	0.00015		
0.0000035	0.00015	0.0000075	78.5
	0.0001		
0.0000025	0.0001	0.000005	77.0
	0.000075		
0.0000015	0.000075	0.0000035	78.5
	0.00006		
0.000001	0.00006	0.0000025	77.0
	0.000045		
0.00000075	0.000045	0.0000015	78.5
	0.00003		
0.0000005	0.00003	0.000001	77.0
	0.00002		
0.00000035	0.00002	0.00000075	78.5
	0.000015		
0.00000025	0.000015	0.0000005	77.0
	0.00001		
0.00000015	0.00001	0.00000035	78.5
	0.0000075		
0.0000001	0.0000075	0.00000025	77.0
	0.000006		
0.000000075	0.000006	0.00000015	78.5
	0.0000045		
0.00000005	0.0000045	0.0000001	77.0
	0.000003		
0.000000035	0.000003	0.000000075	78.5
	0.000002		
0.000000025	0.000002	0.00000005	77.0
	0.0000015		
0.000000015	0.0000015	0.000000035	78.5
	0.000001		
0.00000001	0.000001	0.000000025	77.0
	0.00000075		
0.0000000075	0.00000075	0.000000015	78.5
	0.0000006		
0.000000005	0.0000006	0.00000001	77.0
	0.00000045		
0.0000000035	0.00000045	0.0000000075	78.5
	0.0000003		
0.0000000025	0.0000003	0.000000005	77.0
	0.0000002		
0.0000000015	0.0000002	0.0000000035	78.5
	0.00000015		
0.000000001	0.00000015	0.0000000025	77.0
	0.0000001		
0.00000000075	0.0000001	0.0000000015	78.5
	0.000000075		
0.0000000005	0.000000075	0.000000001	77.0
	0.00000006		
0.00000000035	0.00000006	0.00000000075	78.5
	0.000000045		
0.00000000025	0.000000045	0.0000000005	77.0
	0.00000003		
0.00000000015	0.00000003	0.00000000035	78.5
	0.00000002		
0.0000000001	0.00000002	0.00000000025	77.0
	0.000000015		
0.000000000075	0.000000015	0.00000000015	78.5
	0.00000001		
0.00000000005	0.00000001	0.0000000001	77.0
	0.0000000075		
0.000000000035	0.0000000075	0.000000000075	78.5
	0.000000006		
0.000000000025	0.000000006	0.00000000005	77.0
	0.0000000045		
0.000000000015	0.0000000045	0.000000000035	78.5
	0.000000003		
0.00000000001	0.000000003	0.000000000025	77.0
	0.000000002		
0.0000000000075	0.000000002	0.000000000015	78.5
	0.0000000015		
0.000000000005	0.0000000015	0.00000000001	77.0
	0.000000001		
0.0000000000035	0.000000001	0.0000000000075	78.5
	0.00000000075		
0.0000000000025	0.00000000075	0.000000000005	77.0
	0.0000000006		
0.0000000000015	0.0000000006	0.0000000000035	78.5
	0.00000000045		
0.000000000001	0.00000000045	0.0000000000025	77.0
	0.0000000003		
0.00000000000075	0.0000000003	0.0000000000015	78.5
	0.0000000002		
0.0000000000005	0.0000000002	0.000000000001	77.0
	0.00000000015		
0.00000000000035	0.00000000015	0.00000000000075	78.5
	0.0000000001		
0.00000000000025	0.0000000001	0.0000000000005	77.0
	0.000000000075		
0.00000000000015	0.000000000075	0.00000000000035	78.5
	0.00000000006		
0.0000000000001	0.00000000006	0.00000000000025	77.0
	0.000000000045		
0.000000000000075	0.000000000045	0.00000000000015	78.5
	0.00000000003		
0.00000000000005	0.00000000003	0.0000000000001	77.0
	0.00000000002		
0.000000000000035	0.00000000002	0.000000000000075	78.5
	0.000000000015		
0.000000000000025	0.000000000015	0.00000000000005	77.0
	0.00000000001		
0.000000000000015	0.00000000001	0.000000000000035	78.5
	0.0000000000075		
0.00000000000001	0.0000000000075	0.000000000000025	77.0
	0.000000000006		
0.0000000000000075	0.000000000006	0.000000000000015	78.5
	0.0000000000045		
0.000000000000005	0.0000000000045	0.00000000000001	77.0
	0.000000000003		
0.0000000000000035	0.000000000003	0.0000000000000075	78.5
	0.000000000002		
0.0000000000000025	0.000000000002	0.000000000000005	77.0
	0.0000000000015		
0.0000000000000015	0.0000000000015	0.0000000000000035	78.5
	0.000000000001		
0.000000000000001	0.000000000001	0.0000000000000025	77.0
	0.00000000000075		
0.00000000000000075	0.00000000000075	0.0000000000000015	78.5
	0.0000000000006		
0.0000000000000005	0.0000000000006	0.000000000000001	77.0
	0.00000000000045		
0.00000000000000035	0.00000000000045	0.00000000000000075	78.5
	0.0000000000003		
0.00000000000000025	0.0000000000003	0.0000000000000005	77.0
	0.0000000000002		
0.00000000000000015	0.0000000000002	0.00000000000000035	78.5
	0.00000000000015		
0.0000000000000001	0.00000000000015	0.00000000000000025	77.0
	0.0000000000001		
0.000000000000000075	0.0000000000001	0.00000000000000015	78.5
	0.000000000000075		
0.00000000000000005	0.000000000000075	0.0000000000000001	77.0
	0.00000000000006		
0.000000000000000035	0.00000000000006	0.000000000000000075	78.5
	0.000000000000045		
0.000000000000000025	0.000000000000045	0.00000000000000005	77.0
	0.00000000000003		
0.000000000000000015	0.00000000000003	0.000000000000000035	78.5
	0.00000000000002		
0.00000000000000001	0.00000000000002	0.000000000000000025	77.0
	0.000000000000015		
0.0000000000000000075	0.000000000000015	0.000000000000000015	78.5
	0.00000000000001		
0.000000000000000005	0.00000000000001	0.00000000000000001	77.0
	0.0000000000000075		
0.0000000000000000035	0.0000000000000075	0.0000000000000000075	78.5
	0.000000000000006		
0.0000000000000000025	0.000000000000006	0.000000000000000005	77.0
	0.0000000000000045		
0.0000000000000000015	0.0000000000000045	0.0000000000000000035	78.5
	0.000000000000003		
0.000000000000000001	0.000000000000003	0.0000000000000000025	77.0
	0.000000000000002		
0.00000000000000000075	0.000000000000002	0.0000000000000000015	78.5
	0.0000000000000015		
0.0000000000000000005	0.0000000000000015	0.000000000000000001	77.0
	0.000000000000001		
0.00000000000000000035	0.000000000000001	0.00000000000000000075	78.5
	0.00000000000000075		
0.00000000000000000025	0.00000000000000075	0.0000000000000000005	77.0
	0.0000000000000006		
0.00000000000000000015	0.0000000000000006	0.00000000000000000035	78.5
	0.00000000000000045		
0.0000000000000000001	0.00000000000000045	0.00000000000000000025	77.0
	0.0000000000000003		
0.000000000000000000075	0.0000000000000003	0.00000000000000000015	78.5
	0.0000000000000002		
0.00000000000000000005	0.0000000000000002		

{fol. 5745}

ALUMINUM WIRE AND CABLE INSTALLATIONS

1. ALCOA BUILDING, PITTSBURGH, PA.

At Alcoa's home headquarters can be found one of the most notable examples of aluminum branch circuit wiring installations in recent years.

There are several interesting features worth noting in this project. Branch wiring is in No. 12 aluminum connected to No. 16 copper fixture leads. The connectors are the *bare copper alloy* type. This type of installation proves conclusively that copper and aluminum can be successfully combined in a commercial installation, and that a simple connecting method is practicable. The building's chief maintenance engineer (a registered electrical engineer) indicates that this type of connection has fully justified itself in service, and that it is the present splicing method used when changes in the system are desired.

2. ABRAHAM & STRAUS DEPARTMENT STORE, LONG ISLAND, N. Y.

Here's another interesting installation . . . this time with aluminum cable in *steel* conduit. The electrical system had originally been designed for copper cables, but the shortage of copper during the Korean War forced the substitution of aluminum.

Although the conduit (specified for copper cables) had already been installed, it was found possible to switch to aluminum cable of nearly equivalent capacity. A small supply of copper cable was already on hand, and some feeders were installed with aluminum phase wires and copper neutrals, others with copper phase wires and aluminum neutrals. Connectors and terminal lugs are bolted types, made of plated, cast copper alloy. The maintenance engineers regard the electrical system with great satisfaction and a certain pride in its uniqueness.

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FORGING PLANT, CLEVELAND, OHIO

choice of aluminum wire and cable here was strictly on the basis of competitive bids. The aluminum conductor quotation for the entire job was about 4 per cent lower than that for copper wires. Most of the large, low-voltage feeders are, as open wiring in lightweight aluminum troughs. Installation was completed in 1963.

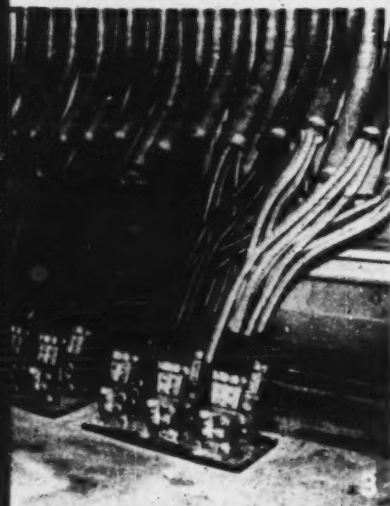
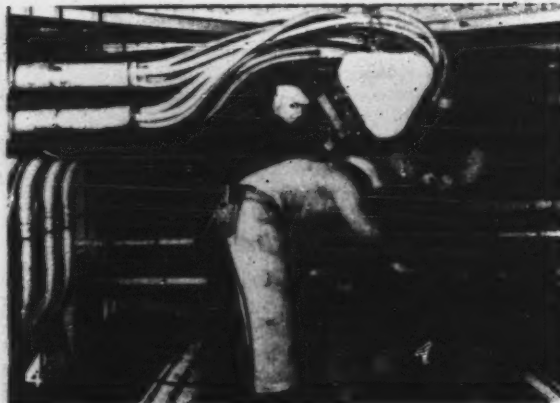
ROLLING MILL, DAVENPORT, IOWA

The mill features one of the first all-aluminum distribution systems in the nation. In addition to the main bus, over 1,800 miles of aluminum wire and cable was installed in sizes from No. 12 to 400 mcm.

Primary circuits from transformers consist of 1,000 and 1,250 mcm stranded aluminum cable with neoprene insulation and neoprene jacket. To avoid sag due to earth settlement, the standard practice of using Transite ducts encased in concrete was discarded in favor of the use of aluminum

conductors from the main bus to remote areas are aluminum cable (one or more 1,000 mcm aluminum cables). Aluminum conduits with aluminum cables connect the motors, switchgear and generators to the bus. Typical crane feeders from the catwalk consist of aluminum cable in aluminum conduits that pass through the catwalk floor.

The electrical contractor on the project, who had experience with aluminum was a new experience. However, he reports his electricians found aluminum cable easier to handle and to work with than copper.



[fol. 5747]

WORKING WITH ALUMINUM WIRE AND CABLE

PULLING THROUGH CONDUIT

A recent poll of electrical contractors with aluminum cable experience indicated that well over half considered it unnecessary to take additional precautions when pulling aluminum cables. Pulling tensions for the electrical installation in the Kitimat, British Columbia, power plant of Aluminum Company of Canada, Ltd., were 10,000 psi, the customary limit for copper. Wire temper was three-quarter hard.

SPlicing AND TERMINATING

Insulation should be stripped from the ends of an aluminum wire or cable by "paring off," as shown here, instead of "ringing." Round nose pliers should be used whenever bending the end of the wire into a loop or hook.

Aluminum cables can be spliced or terminated by the use of compression fittings, mechanical fittings, welding or soldering, as shown here. For mechanical fittings, a coating of compound, such as Alcoa No. 2 Joint Compound, should be used to assist cleaning and to prevent oxide reformation on the abraded aluminum surface.

The results of extensive research and development work have shown that it is better to use fittings of aluminum on aluminum conductors than fittings of other metals. However, satisfactory test results have been obtained with some types of tin-plated copper alloy bolted fittings when tested either with aluminum cable with relatively soft strands or with a suitable joint compound properly applied, or both. A large variety of compression-type fittings of aluminum are available. They have shown very satisfactory service in industrial plants and commercial buildings. These fittings are of high conductivity metal, electrical conductor grade or similar, and of fully annealed temper.

Making a loop or hook on the end of an aluminum wire is easily accomplished by the use of round nose pliers.

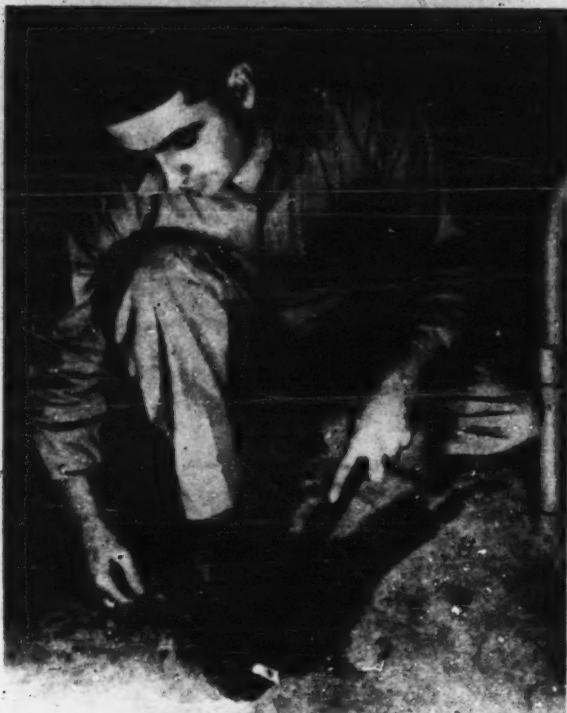
Portable welding equipment is often used to attach aluminum cable to lugs and terminals. This type of termination ensures excellent physical and electrical contact.

Typical bolted and compression aluminum fittings.

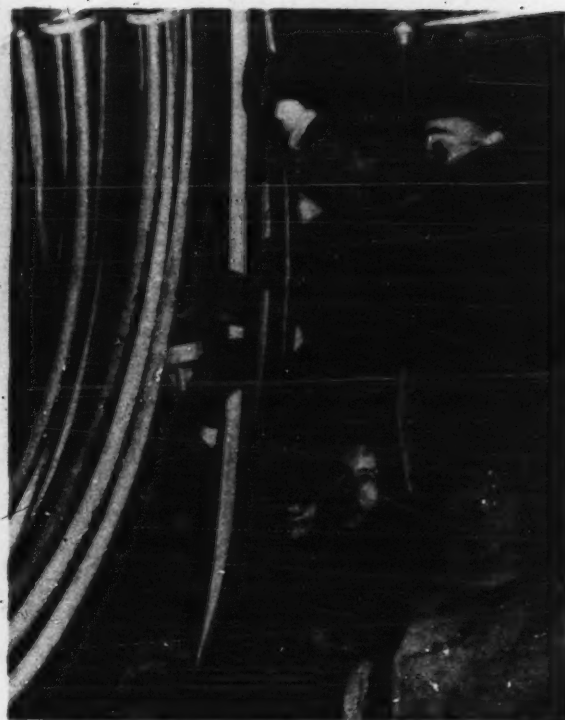
[fol. 5748]



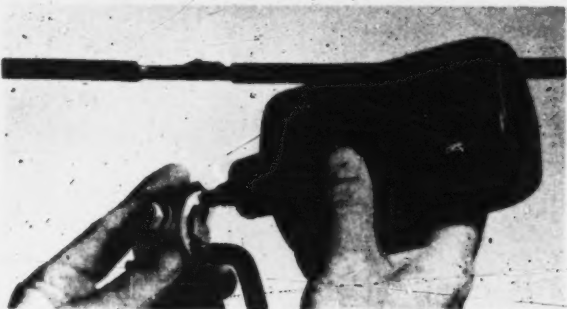
The proper method of removing insulation from aluminum cable is shown here. Insulation is peeled off with a regular knife.



Compression fittings are one of the most popular methods of terminating aluminum cable. Physical and electrical contact is secure and positive.



Pulling aluminum cables through conduit is accomplished by the same methods as for other types of cable.



Use of Alcoa No. 2 Joint Compound assures good electrical contact. A long tip on the handy plastic squeeze bottle can be inserted inside mechanical fittings for fast, clean application.

ALUMINUM BUS CONDUCTOR

Bus conductor was one of the first major uses of aluminum. The excellent physical and electrical properties of aluminum in this application were recognized from the very beginning.

In 1895, a large quantity of flat aluminum bar was used for a 20,000-amp installation at Alcoa's Niagara Falls, N. Y., smelting plant. Three years later this plant was remodeled and the bus bar remained in service until 1940, when the plant was retired. This type of conductor was standard, thereafter, in aluminum smelting plants for connecting dc conversion equipment and for pot-room feeders.

Later, aluminum bus came into use in chemical plants where corrosive attack was especially severe. It appeared in telephone exchanges during the 30's. It carried power in steel rolling mills even before then. A bus system installed in 1929 in the American Rolling Mill Company, Middletown, Ohio, is still in operation.

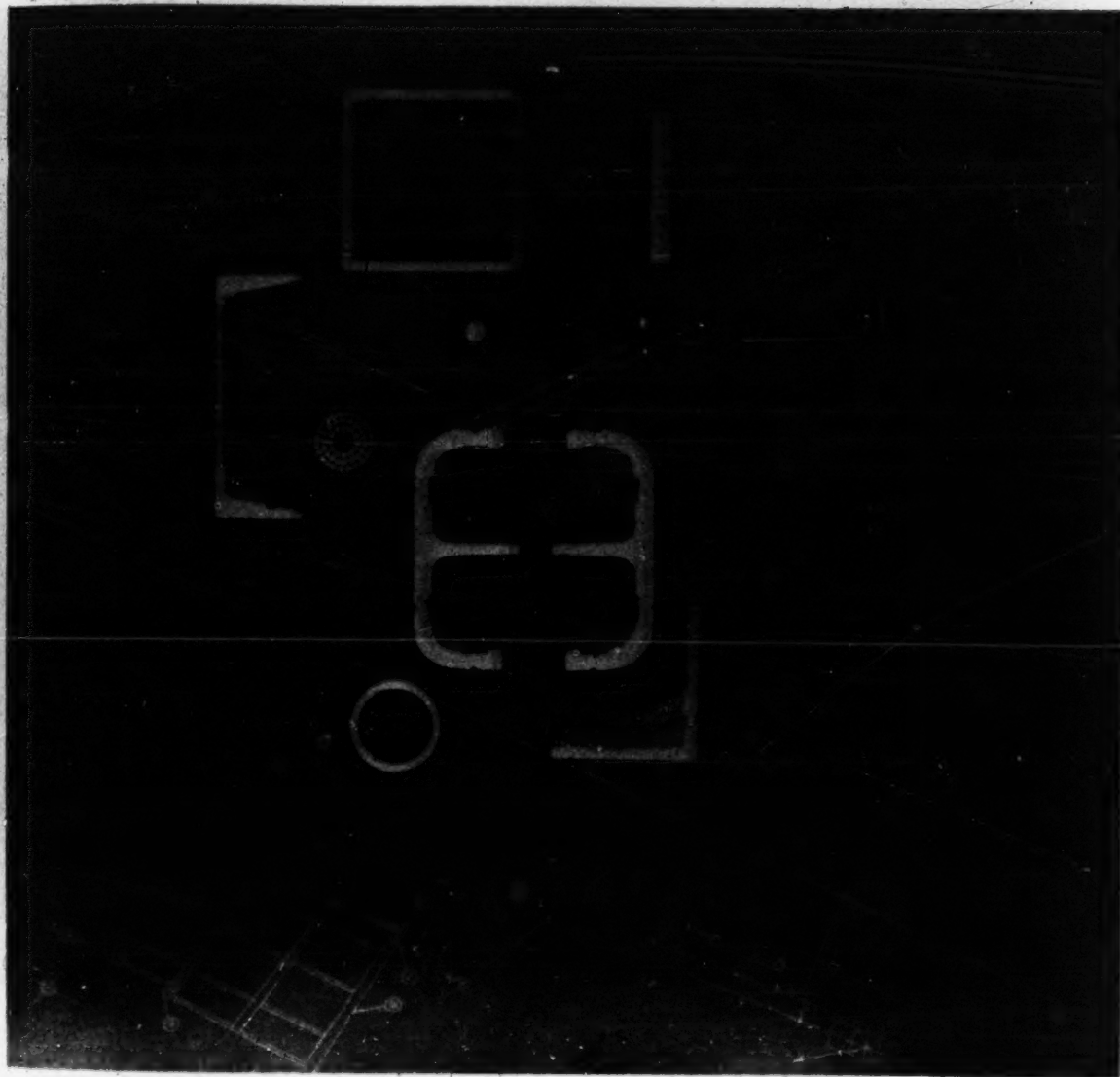
One of the first aluminum bus risers was put into service in 1930 to supply power to the Marshall Field Office Building in Chicago. It extended from the basement to the 45th floor and was fabricated from channels over 60 feet long.

An extruded aluminum sector bus serves as the vertical riser for the Alcoa Building in Pittsburgh. This same type, installed horizontally, provides a convenient power tap-off source in Alcoa's Davenport, Iowa, plant.

Today aluminum bus is replacing copper conductors and is the accepted standard with many in the industry. It is essentially the electrical equivalent of copper conductor bus at lower cost, providing the same load capacity as copper at about the same voltage drop, and offering significant weight saving advantages. Because an aluminum bus conductor has a slightly larger area than its copper equivalent, it can dissipate heat more efficiently. Aluminum can be silver plated for applications where silver-plated copper joints are the standard for the manufacturer.

Shown here are some of the more widely known types of aluminum bus conductors including flat bus bar, square bus, integral web bus, structural bus, tubular bus and stranded conductor bus. Applications of these types in commercial and industrial busway systems are illustrated in the last part of this section. Special and unique conductor shapes can be easily extruded in aluminum if peculiar requirements exist in special applications.

[fol. 5750]



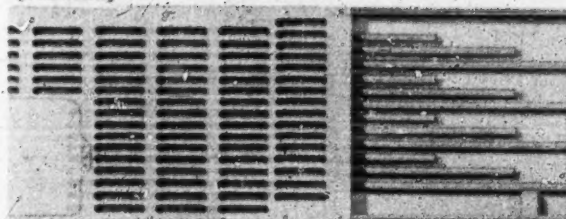


Fig. 1
SPACE REQUIREMENTS FOR ONE AMPERE LOAD
ALUMINUM BUSWAY AND COPPER CABLES

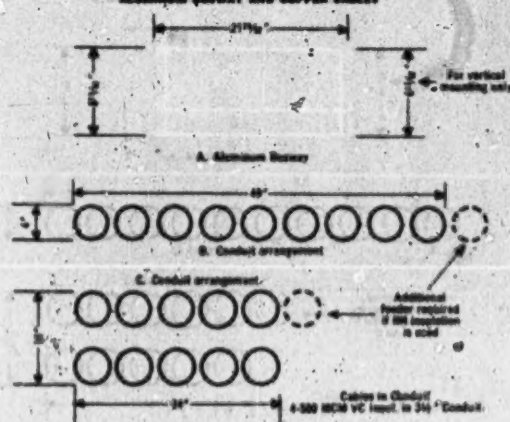
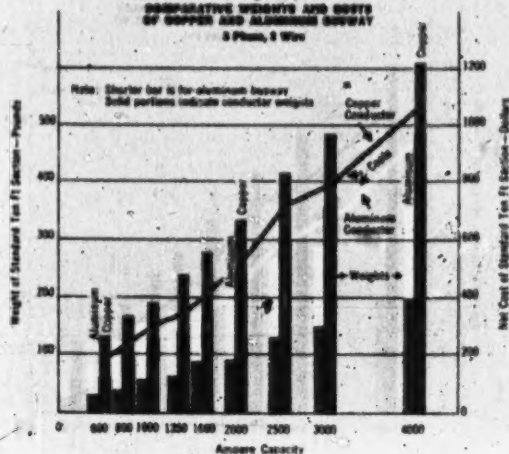


Fig. 2
COMPARATIVE WEIGHTS AND COSTS
OF COPPER AND ALUMINUM BUSWAY
3 Phase, 3 Wire



ALUMINUM BUSWAY

Aluminum busway is a popular commercial adaptation of bus bar. It is relatively new in the commercial market compared with traditional copper cable and copper bus. Its emergence as a practical and economical product is evidenced by its wide use in many of today's largest commercial buildings.

There are several reasons for recommending aluminum busway riser systems in preference to the older, more conventional cable and conduit systems.

Such risers are more compact than their cable and conduit electrical equivalents. Fig. 1 compares the minimum space requirements for a 4,000-amp load carried by aluminum bus and copper cables.

An aluminum busway has greater current-carrying capacity for a combination of loads than other systems. Considerable economies can be realized by combining loads with different peak times on the same feeder.

An aluminum busway riser saves switchboard room space. In effect, the busway, with its tap-offs, is the switchboard. Once a riser of adequate size, including spare capacity, has been installed, future loads may be tapped-off at any point along its length with a minimum of time and trouble. This flexibility is of great importance in commercial buildings where new tenant requirements or new machines may suddenly demand large increases of power at any one of a number of floors.

For busway applications, it is customary to silver-plate aluminum conductors the same as copper. An aluminum busway system weighs one-fourth as much as an equivalent copper cable and steel conduit system. This factor alone contributes to lower installation costs because the busway is easier to handle and installers can work more efficiently. Weight comparisons are shown in Fig. 2.

Relative costs for an aluminum and copper busway installation are shown in Fig. 3. Only relative values are shown because conditions and practices vary from job to job, depending on size of installation, working conditions, and a vertical or horizontal run. In general, it can be noted that installation savings will run about 25 per cent lower on most aluminum busway projects, as compared to those with copper of the same ampere rating.

Fig. 3 also indicates a 50 per cent greater installation cost, going from 600 to 800-amp copper bus, while these costs remain the same for the same capacity aluminum bus.

Fig. 4 compares the costs of a recently completed office building installation in New York City. Here, a complete material and installation cost breakdown for specific sizes and lengths of wire and cable is presented.

[fol. 5752]

Fig. 3
RELATIVE INSTALLATION COSTS—ALUMINUM vs. COPPER BUSES

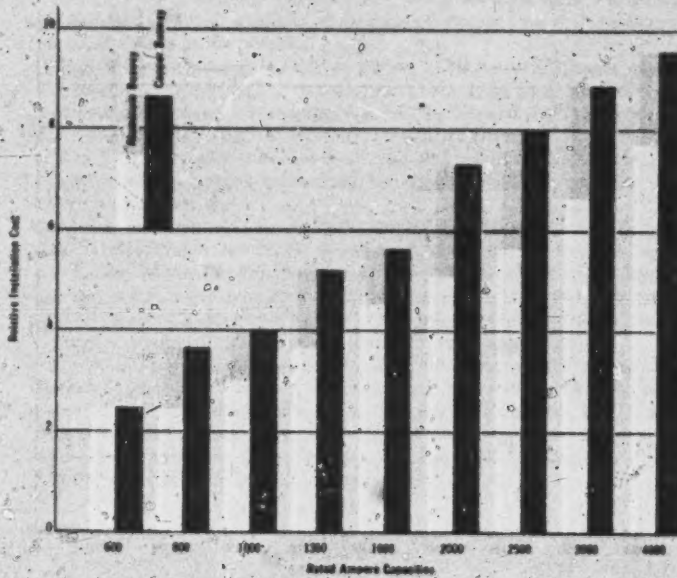
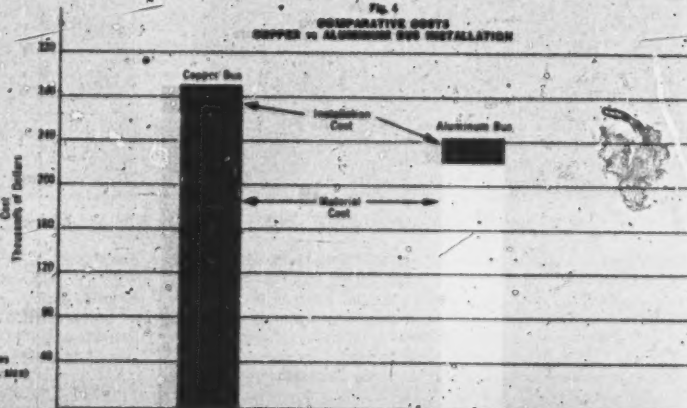


Fig. 4
COMPARATIVE COSTS
COPPER vs. ALUMINUM BUS INSTALLATION

Note: Profit, overhead,
and sales tax not
included in chart
or calculation.



Question:
1200—2000A Bus
200—3000A Bus
77—TypeB Substation
(3BA in 600A, 400A)

COST TABULATION

	Aluminum	Copper	% Diff.
Material Cost	\$122,000	\$148,000	
Labor Cost	18,000	28,000	
Totals	140,000	176,000	
Difference		36,000	
Labor as % of Cost	12.9%	15.9%	

[61. 5753]

ALUMINUM BUSWAY INSTALLATIONS

SOCONY-MOBIL BUILDING, NEW YORK, N. Y.

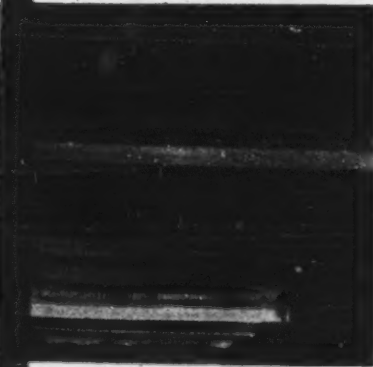
Practically all new office buildings are being designed today with an aluminum electrical backbone capable of supporting foreseeable future loads. A good example is the Socony-Mobil Building in New York.

Into this vast air-conditioned structure have been built eight 4,000-amp aluminum busways rising in two groups from basement to the 42nd floor. Four of these are 3-phase, 3-wire; and four are 3-phase, 4-wire, with full neutral. Two of the former type terminate on the 14th floor, and the remaining six extend to the 42nd floor.

Fig. 5 indicates the total linear footage and weight of aluminum bus actually installed as compared to the copper equivalent. Estimates submitted by other contractors were in line with those shown here.

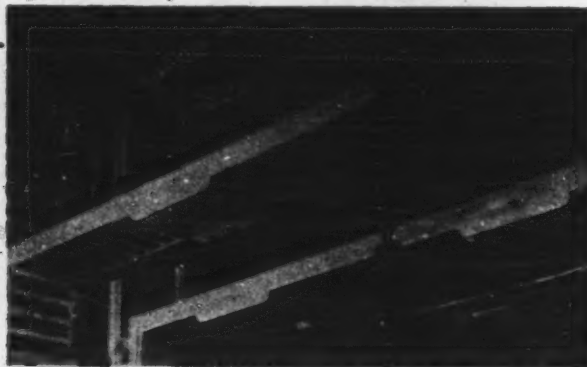
Aluminum conductor busway was favored for this installation because of its lower voltage drop, a most important factor where long runs occur, as they do here. The longest busway run in the Socony-Mobil Building is about 700 feet. Over this length, the aluminum bus carries its full rated load at 86.6 per cent power factor (30-degree lagging load) with a drop of 3.50 per cent of source voltage. Copper busway with the same load would incur a voltage drop of 4.92 per cent, or 18 per cent greater than aluminum.

To match the performance of the aluminum busway with copper cable here would require twelve 3½-in. conduits, each carrying four 500 mcm cables. A comparison of estimated material and installation costs for each system is illustrated in Fig. 8. It can be seen that a copper cable and steel conduit installation would be more than four times as heavy as the equivalent aluminum conductor busway. For a 700-ft riser, the difference comes to about 110,000 pounds, or nearly an additional ton per floor.



STATE BUILDING, NEW YORK, N. Y.

When air-conditioning loads are making pre-electrical systems inadequate. The world's building solved this problem by installing a 4,000-amp, 3-phase, 4-conductor, 265/460-volt aluminum busway system and a 4,000-amp, 3-phase, 4-conductor, 460-volt aluminum busway system.



NEW YORK COLISEUM, NEW YORK, N. Y.

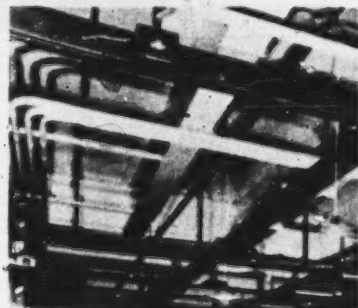
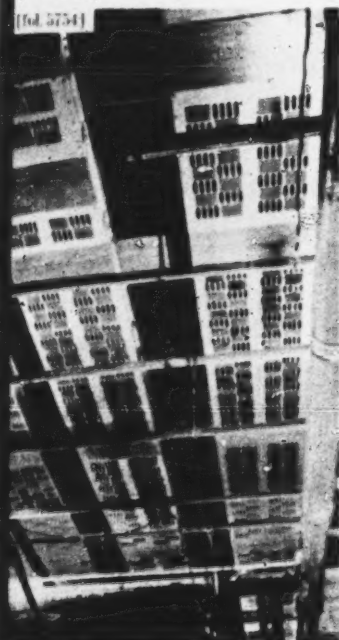
This 26-story office building has one of the first major installations of a higher voltage distribution system (480Y/277 volts). More than 2¼ miles of busway incorporating aluminum conductors was used to feed power to this huge structure. The higher voltage system provides greater capacity and flexibility than conventional systems. Yet it requires only half as many, or half as large, risers and feeders. The use of lightweight aluminum busway sections made the installation easier and faster.

Fig. 1
BUREAU OF STANDARDS
CONDUCTOR SIZES AND WEIGHTS
Based on August, 1966 Prices

	Aluminum Conductor (Actually installed)	Copper Conductor (Estimated Equivalent)
Total length (includes 3 phase, 3 wire and 3 phase, 4 wire, 4,000 Ampere busway)	4,750 ft.	4,750 ft.
Total Weight	187,000 lbs. 100%	276,000 lbs. 147%
Material Cost	\$40,000 100%	\$90,000 125%
Per cent		
Estimated Installation Cost	\$ 78,000 100%	\$ 78,000 100%
Per cent		
Weight of Conductor	92,000 lbs. 100%	276,000 lbs. 300%
Per cent of weight of Aluminum Busway	50%	175%

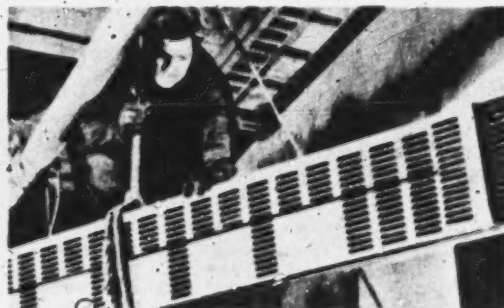
Fig. 2
COMPARISON OF ESTIMATED MATERIAL AND LABOR COSTS
FOR BUSES AND CABLES IN CIRCUIT

	One Conduit with Cable	Twelve Conduits with Cable	Aluminum Con- ductor Busway	Copper Con- ductor Busway
Material cost per ft.	\$ 6.37	\$100.00	\$117.50	\$135.00
Installation cost per ft.	3.50	47.00	7.50	10.00
Total cost	11.87	147.00	125.00	145.00
Ratio of cost to Aluminum Busway		1.18	1.00	1.21
Weight, pounds per 10 ft. Section		7,064	500	820
Ratio of weight to Aluminum Busway		4.14	1.00	1.64



FORD MOTOR COMPANY PLANT,
SAN JOSE, CALIF.

Since 1951, over 1,500,000 pounds of aluminum busway have been installed in various Ford plants. Use of this conductor in Ford's San Jose plant made a neat, safe, flexible installation that brought power to the job in any amount, at any location. Standard fittings, tools and methods of installation were employed.



CHRYSLER CORPORATION STAMPING PLANT,
TWINSBURG, OHIO

The entire plant is covered with a network of aluminum busways. Light-duty, 50 amp plug-in busways serve the fluorescent lighting load. Plug-in busways with ratings from 400 to 600 amp, braced for a 50,000 amp short-circuit current, serve the motor loads and general factory requirements. For heavy welding loads, 1,000 amp, low voltage drop, plug-in aluminum busways are used.

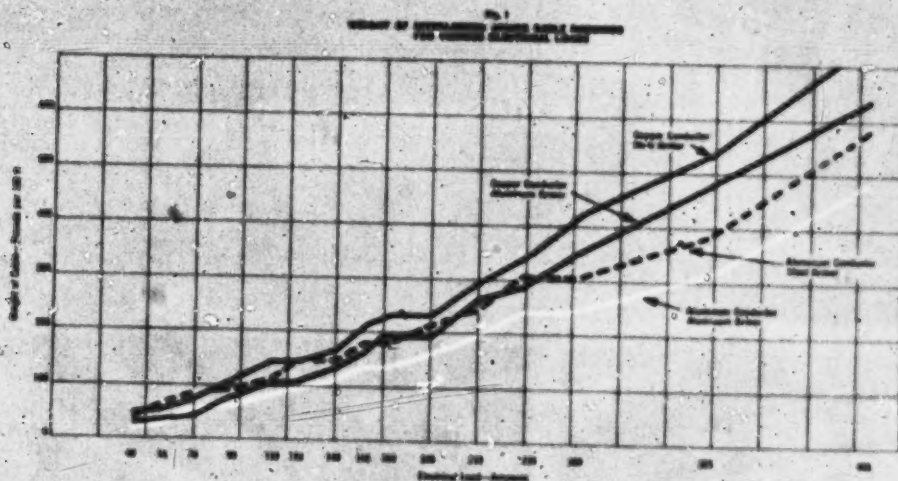
[66, 5755]



ARMORED CABLES

INTERLOCKED ARMORED CABLE

This type of conductor is appearing more and more in industrial and power plant installations. It consists of an aluminum or copper conductor in steel or aluminum armor. The metallic exterior, or armor, is spiral-wound with successive interlocked convolutions. Armor and conductor materials may be combined in four commercially available types of cable—copper conductor in steel or aluminum armor, and aluminum conductor in steel or aluminum armor.



Interlocked armored cables have certain advantages over the common cable and conduit combination, especially for long open runs of considerable capacity where several cables may be carried in a single rack support.

Installation cost estimates of armored cable manufacturers and those quoted by electrical contractors have varied widely. Even so, the total cost of a copper cable installation in the more popular circular mill sizes would be 15 per cent to 20 per cent greater than for an equivalent aluminum cable installation.

Fig. 1 shows the weight of 3-conductor armored cables in the various combinations of copper, aluminum and steel for various electrical loads. The obvious advantage of aluminum's lighter weight and its attendant lower installation costs is a prime consideration. Weight savings run from about 20 lb per 100 ft for 3-conductor No. 6 wire to about 100 lb per 100 ft for 3-conductor 750 mm cable. The same relationship holds true for other sizes of cables. This significant weight advantage reduces shipping costs, permits longer pulls and reduces the number of supports required.

Cable support systems for this type usually consist of troughs, racks, baskets or trays made of lightweight members, with bottoms of expanded metal plate or spaced rings. Aluminum support systems are considerably easier to install than those made from other metals. They require no maintenance and have a practically unimpaired salvage value.


[fol. 5756]

The flexibility of aluminum-sheathed cables is demonstrated by this installation at the California Packing Corporation, Redwood, Calif. Notice how the cables may be twisted into right angle turns as they leave the cable tray. The use of clamps and trays makes installation of this type of conductor fast and convenient.


ALUMINUM-SHEATHED CABLE

Another product, relatively new on the building scene, that shows great promise is aluminum-sheathed cable. This type of conductor can eliminate conduits and other types of cable-carrying systems. Its flexibility and small diameter permit installation in areas inaccessible or difficult for typical conduit installations, and provide more economical use of limited space. The smooth, seamless sheath reduces the collection of electrolyte and moisture, and makes the cable impervious to insulation attacks by liquids and gases. Aluminum-sheathed cable has high tensile strength and rigidity, yet is easily bent with standard tools. It is mechanically strong and has excellent flame-resistant properties.

A tremendous market potential exists for this type of conductor, not only in control cable but in power and high-voltage applications as well. New developments in applying aluminum in this field will undoubtedly open up these markets, especially because of basic weight, and cost savings over lead.



An aluminum interlocked cable at the same mill carries 12,000 volts from the secondary of the transformer at bottom right to switchgear at left.



Nine 500 mcm all-aluminum interlocked armored cables feed 2,300 volts into this switchgear at Alcoa's Davenport, Iowa, foil mill.

LARGE SWITCH ENCLOSURES, SWITCHGEAR

There are other electrical products for the building industry where aluminum offers distinct technical and installation advantages. In some instances, aluminum's physical properties strongly influence its choice over other metals.

Aluminum sheet metal enclosures, for example, have much lower induced electrical losses than ferrous enclosures, and better appearance and higher heat conductivity than their steel counterparts. In addition, they are lighter, much more corrosion resistant, and offer correspondingly reduced maintenance costs.

The use of an aluminum enclosure instead of a steel enclosure will enable a given size of switch to safely carry a greater load. For one thing, steel enclosures have appreciable magnetic losses. Another important factor is that aluminum, because of its higher thermal conductivity, dissipates heat four times better than steel.

Fig. 1 shows the cost estimates for a service entrance switch in an office building. The switch is rated at 6,000 amp, 2-phase, 4-wire in both aluminum and steel enclosures. Included in this cost estimate are the capitalized cost of the energy losses and costs for air conditioning required to remove additional heat generated by the switch in the steel enclosure.

The cost of the additional energy loss accruing to the steel enclosure should be considered when purchasing a service entrance switch of this size. In addition to the savings shown in Fig. 1, installation costs should be slightly lower for the aluminum enclosure because of its lighter weight. Fig. 1 also shows that a service switch in an aluminum enclosure may effect savings upwards of 20 per cent over a similar switch in a steel enclosure.

Fig. 1
COST OF 4,000-AMPERE SWITCH FOR OFFICE BUILDING

	Steel Enclosure	Aluminum Enclosure
Net Purchase Cost	\$4,380	\$4,538
Cost of Additional Energy dissipated	880	
Cost of Energy for Additional Air Conditioning	160	
Total actual cost	\$5,420	\$4,538
Cost difference		\$882 or 19.5% more than purchase of aluminum enclosure switch.

This power center controls pumps, compressors, generators, propellers and other associated machinery in a large commercial building. Bus bars, terminals and complete housing are made of aluminum.

An all-aluminum, 480-volt switchgear unit is shown here. Main bus is rated at 1,800 amp, braced to withstand a 75,000-amp short circuit.

[fol. 5730]

Fig. 1—Here is a view of the aluminum bus system at Alcoa's smelting plant No. 3, Niagara Falls, N. Y. The bus was installed in 1898 and gave continuous service until plant was dismantled in 1949.

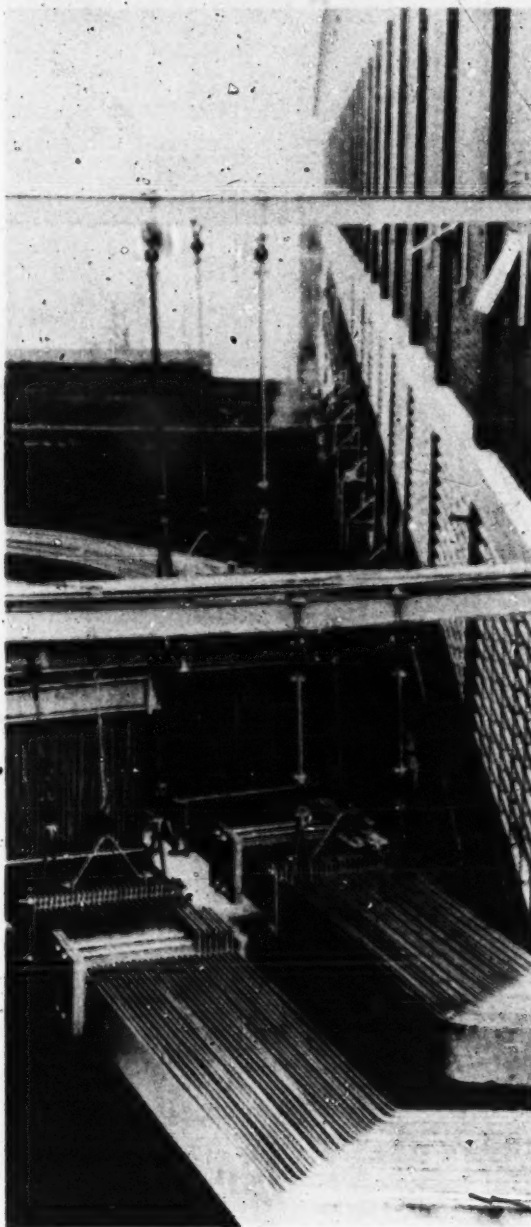


Fig. 2
PRODUCTION OF PRIMARY ALUMINUM AND COPPER IN THE UNITED STATES
Source: U.S. Bureau of Mines; American Metal Market

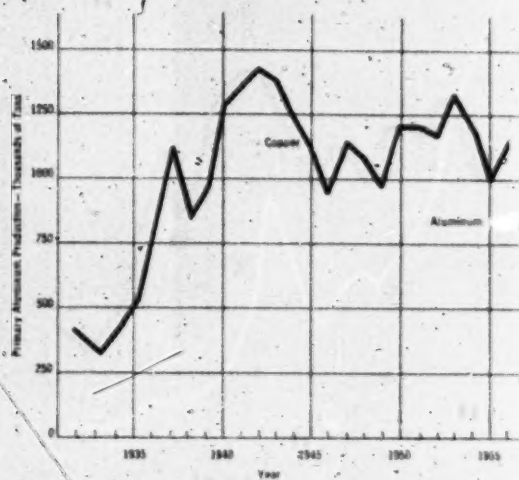
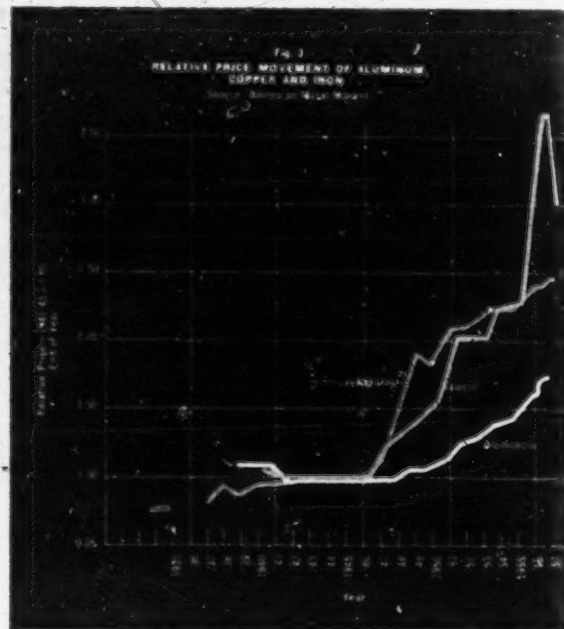
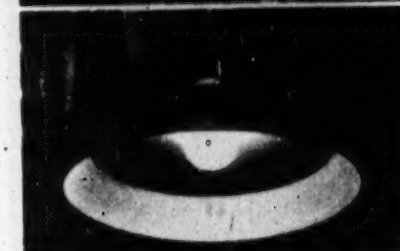
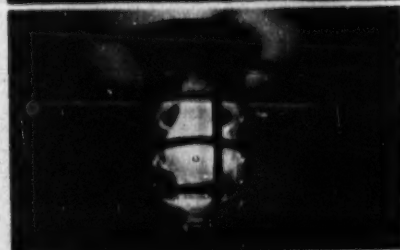
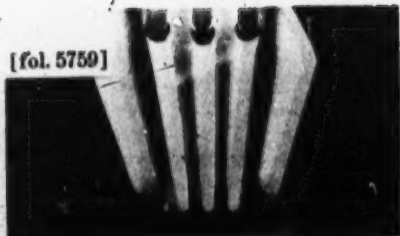


Fig. 3
RELATIVE PRICE MOVEMENT OF ALUMINUM,
COPPER AND IRON
Source: American Metal Market



[Vol. 5759]



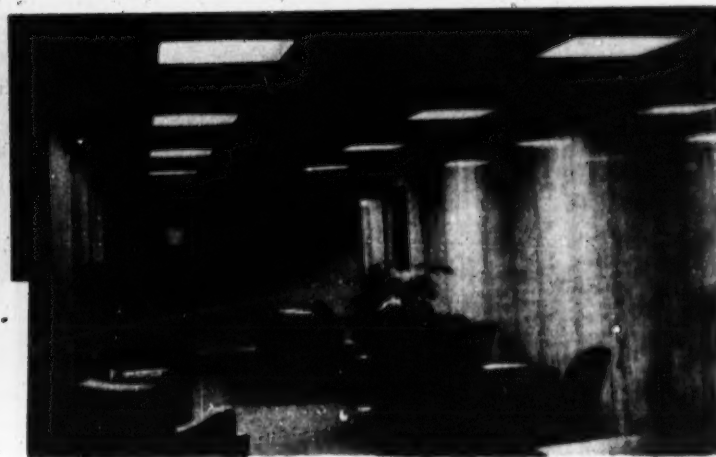
ALUMINUM LIGHTING FIXTURES AND ACCESSORIES

Aluminum fixtures are available for almost every standard application. Alzak* reflectors are used extensively for high-quality lighting and especially where accurate light distribution should be employed. Among the applications requiring skillful control of light distribution are high bay lighting, floodlights and searchlights.

Among the many troffer-type fixtures widely used in offices and commercial applications is the Alzak troffer with parabolic reflectors and special, low brightness cross baffles or louvers. The outstanding features of this fixture are simple design, excellent quality lighting without the need of special lenses, low glare factor and high visual comfort index.

The rapidly spreading popularity of aluminum for troffers and luminous ceilings is due to its natural characteristics of light weight, excellent adaptation to light control, and economy.

*Trademark of Aluminum Company of America



CONCLUSION

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It is hoped that this Alcoa Report has served to demonstrate aluminum's versatility and economy in electrical building products, and that those reading it will have gained some measure of useful information.

The correlation between the Alcoa Report and one section of the Ashley Report is very close. The latter included some conclusions and impressions from a poll of some 400 electrical contractors—all members of The National Electrical Contractors Association. The findings of the poll are summarized as follows:

1. Nearly three-fifths of the contractors had had experience with aluminum wire and cable.
2. There is a very widespread interest among contractors in aluminum electrical applications. Practically every contractor indicated a desire to be informed of the results of the survey.
3. There is a general opinion that aluminum is economical for wire sizes above No. 4/0, but noncompetitive below this size.
4. There is a strong awareness of aluminum splicing differences, coupled with the belief that present splicing methods are adequate and practical.
5. About half the contractors feel that there are appreciable labor savings in aluminum conduit installation, although some reported difficulties in conduit threading and steel tape pulling. The rest feel that there are economies, particularly in the larger conduit sizes, ranging in general from 5 to 30 per cent.
6. Four-fifths of the contractors who have installed aluminum feeder bus duct report installation savings. Most estimated savings are in the 5 to 20 per cent range.

This report is being deliberately submitted to echelons of business where it will provoke, we hope, considerable discussion from managerial, engineering, purchasing and operating personnel.

Printed in U.S.A.

[fol. 5762] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 374

July 2, 1958.

Mr. L. C. Vipond
Office of Airports
Civil Aeronautics Association
Washington, D. C.

Dear Les:

One of our salesmen, Mr. Lawrence Kernan, has advised me of his recent visit and I hope this is just the beginning of more frequent calls at your office from Rome Cable personnel, including a certain R. C. Graham, as soon as he can get to it.

In regards to use of an aluminum conductor for L-824 Lighting Cable, our analysis indicates that a #6 AWG aluminum cable would definitely cost more and sell at a higher price than a #8 AWG copper in 600 volt Type A, 3,000 volt Type B and 5,000 volt Type B.

Simply as a matter of information, I might advise you that we have had very little experience with insulated aluminum buried directly in the ground. In fact, wherever we are selling a cable construction including an aluminum bare neutral it has become almost mandatory to use a wall of polyethylene insulation rather than neoprene in order to completely exclude any possible moisture affects.

If aluminum offered any economic or technical advantages in such a construction, I think we would be quite aware of its possibilities. However, I cannot visualize any economic or technical advantages if we must substitute the electrical equivalence as in this case.

Your interest in this matter is appreciated.

Kindest regards.

Very truly yours, Rome Cable Corporation, Bob.
R. C. Graham, Chief Engineer.

RCG:ceb

[fol. 5763] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 375

September 17, 1959.

Commanding Officer,
U. S. Naval Construction Battalion Center,
Code 142,
Port Hueneme, California

Re: 14223/CMC/dw6145-FY60-3

Att: C. A. Weske, Procurement Division Director

Gentlemen:

This is in reference to your inquiry of August 25 to our Torrance, California, plant, pertaining to Portable Power Cable—600 volt, with stranded aluminum conductors.

There has been very little activity in the industry with aluminum conductor portable power cables. There has been some mining machine cable (parallel duplex) on which the service record showed very poor results due to the tension applied on the cable and due to the fact that it was run over by heavy equipment. Aluminum conductors do not have sufficient mechanical strength to withstand either of these punishments.

As a result, we do not have published information on this cable but are attaching hereto a general specification covering construction on 2/Conductors, 3/Conductors and 4/Conductors in both Type W and Type G—600 volt.

We trust this information will be of use to you, and if there is any further information required, please let us know.

Yours very truly, Rome Cable Corporation, O. O. Stedman.

OOS:O
enc.

[fol. 5764] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 377

October 19, 1959.

Mr. Harry Shopp, Chief Electrical Inspector,
County of San Diego,
1600 Pacific Highway,
San Diego 1, California

Dear Mr. Shopp:

I am sending this letter to you along with a copy to Art Vesco as I know Herb Ufer discussed this situation with you.

The point in question is whether or not bare aluminum wire should be used as a ground conductor buried directly in the earth. Our research department has done some investigating on this and have come up with the following:

1. Problems involving the use of bare aluminum as a ground wire buried directly in the earth are inherent in the metal itself and cannot be attributed to poor quality of conductor. It is not felt that alloying the metal would help to the extent of being economical.
2. The Aluminum Company of America, the strongest advocates for the use of aluminum as electrical conductor, find it necessary to use copper for grounding conductors (buried in the soil) in and around their various plants. This company uses aluminum insulated conductors throughout in new installations.

In line with the above Rome Cable has reached a decision that they will no longer furnish or recommend the use of bare aluminum as a grounding conductor when buried directly in the earth.

We felt that the above information would be of value to you both.

Very truly yours, Rome Cable Corporation, R. D.
Golly.

RDG:O

cc: Mr. Art Vesco

[fol. 5765] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 378

Internal Correspondence

August 24, 1960.

From: R. A. Schatzel
To: Mr. G. E. Rolston

Subject: Appliance Cords with Aluminum Conductor

Below is a report on development of SPT and appliance cords with aluminum conductors. If U/L approval is sought the problem and requirements are the same.

From the limited production on which this report is based the following conclusions may be drawn. If actual production were contemplated further development of improved methods would be required.

1) Based on the use of .010 aluminum wire we feel satisfactory bunched strand may be produced but at a slower speed than for bunching copper wire.

2) *Plastic Insulating*—With the use of a paper separator we believe that production of cord is possible. Down time due to breakage would be greater than with copper but tolerable. In short no insuperable production problems should exist.

3) *Cost*—If two AWG sizes larger for aluminum than for copper is required (16/al vs. 18/cu), #16 cord with paper separator would be comparable in cost with #18 copper without separator. From our tests on voltage drop, indications are that #17 AWG aluminum would be adequate. (Acceptance of this by Underwriters' could not be assured).

4) *Performance*—E.C. aluminum strand has inadequate strength and flex resistance to meet Underwriters' Laboratories indicated requirements.

[fol. 5766] Purpose:

To develop SPT Cord with aluminum conductors and to study the possibilities of the use of aluminum for this application.

Discussion :

The use of aluminum for the conductors of flexible cords would provide an outlet for considerable quantities of aluminum if it could be proven satisfactory for this service. Alcoa has been working for quite some time with the American Insulating Company on the development of SPT cord with aluminum conductors but the results have been somewhat less than satisfactory because of their inability to work closely enough with them to determine the problems involved in the manufacture of this product. The problem was, therefore, given to Rome Cable to determine if aluminum conductor SPT Cord could be economically produced and to investigate the possibilities of the use of aluminum for this application in comparison to the present U/L approved copper conductor SPT Cord.

Rome has been interested in using aluminum in appliance wire and cords.

Summary:

Samples of #16/2 and #18/2 conductor cord were produced. A preliminary study of costs indicates that a #16 aluminum conductor cord can be produced at a cost equal to or lower than the cost of a #18 copper conductor cord. The question was raised and tests were conducted which show that for this application, the aluminum equivalent may not need to be two AWG sizes larger than copper. If this is true, it would be a further cost advantage in favor of aluminum.

[fol. 5767] A comparison of the performance characteristics of aluminum conductor cord with copper conductor cord shows the aluminum to be relatively poor. The strength of the #16 conductor cord is approximately 75% that of the cord with #18 copper conductor and its flex life is roughly $\frac{1}{3}$ that of copper. Underwriters' Laboratories have expressed themselves that for aluminum to be considered for this and appliance wire application, it should perform better than 50% as well as copper.

Procedure:

Sample Development

Wire Drawing

At the start of this investigation it was assumed that the .010" aluminum wire for stranding would be drawn at Rome. Several attempts were made to draw this on the old Rome fine wire drawing machines which had been set up for this purpose. After a considerable amount of work and investigation it was concluded that these machines were unsuitable due principally to slow drawing speed. .010" EC H-19 wire became available from Massena and wire from this source was used for most of the samples produced. The cost data for drawing .010" wire at Rome, which is shown later in this report, is based on providing Vaughn Ring Blox fine wire drawing machines and assuming that one operator could operate five machines.

Stranding

The .010" wire was bunched before annealing to take advantage of the greater strength of the hard drawn wire. Stranded conductor for the original samples was produced on the New England Butt buncher. After the Cook buncher from Massena became available, all strand was bunched on this machine as it was considered much more suitable. To [fol. 5768] avoid excessive breakage of the individual wires, the bunching speed was reduced to 50% of that used for bunching copper strand. At this speed there were relatively few breaks, but as the machine is not equipped with automatic stops, whenever a break did occur there was a loose end in the strand.

Annealing

The stranded conductor was annealed to $\frac{1}{4}$ hard temper. Retipping

The aluminum strand was not retipped before insulating as is the practice with copper strand. Previous experience had shown that bunched aluminum strand is easily damaged by respooling, resulting in broken wires which cause "bird nesting" and conductor breaks at the insulator. Additional study of this problem is necessary.

Insulating

Samples of #16/2 and #18/2 were produced without separator and with paper fold separator. Without separator lengths ranged from 1000 ft. to 2500 ft., it being impossible to obtain longer lengths because of "bird nesting" and conductor breaks caused by the loose ends of broken wires in the strand. With separator the performance was much better, however, frequent breakage still occurs. More extended experience probably would lead to a solution. The separator was applied longitudinally at the extruder. It was also desired to obtain performance test data on the finished cord both with and without separator.

[fol. 5769] Samples and Preliminary Cost Data

Sample	Size	Strand	Insulated	Cost/M'
1	# 18	16/.010**	126" x .227"	\$ 7.38
2	# 18	16/.010***	126" x .227"	6.72
3	# 16	26/.010**	148" x .257"	10.18
4	# 16	26/.010***	148" x .257"	9.09
5	# 16	26/.010" paper fold*	151" x .263"	10.42
6	# 16	26/.010" paper fold**	151" x .263"	9.31
7	# 18	42/34 bare copper	126" x .227"	9.36

* .010" EC H-19 purchased from Massena. (More recent estimate from Pittsburgh, approximate Rome estimate).

** 3/8" rod purchased from Massena and drawn to .010" at Rome.

Tests:

Overall Strength Test

Samples of the finished cord were broken on the Scott rubber tensile testing machine. The results are the average of three tests.

Flexing Test

Samples were flexed on the Bureau of Mines Flex Testing Machine through an arc of 180° under tension of a six-pound weight. Results are the average of three tests.

Twisting Test

Samples were subjected to a twist test using the U/L twist testing machine for heater cords. Results are the average of three tests.

[fol. 5770] Results:

Sample	Lbs. Break	Flexing Test Cycles to Failure	Twisting Test Cycles to Failure
#16 26/.010 SPT-1 Al. Condr.....	67.5	55	24
#16 26/.010 SPT-1 Al. Condr. with paper sep.	68.0	74	33
#18 16/30 SPT-1 Al. Condr.....	39.0	43	16
#18 42/34 SPT-1 Copper Condr.....	90.0	369	99
#18 16/30 SPT-1 Copper Condr.....	88.0	220	65

The use of aluminum conductor in appliance wire and cords was informally discussed with Underwriters' Laboratories to obtain information on testing and possible requirements. U/L have previously made several investigations and have quite definite opinions. Without seeing any of our results or our opportunity to review theirs they seemed quite convinced that E.C. grade aluminum in these smaller cords would not meet service requirements. They felt that strength and flex resistance were inadequate.

The requirements they would stress were:

(a) Breaking strength compared to copper. Test to be made on uninsulated conductor. Strength should be at least 50% of soft copper.

(b) A complete study of the soldering techniques would have to be made in view of the fact that aluminum is reportedly much more difficult to properly solder than copper. In addition there would be a test on the flexibility of the soldered joint.

(c) A current flow test through soldered joints would be made which would be for roughly 60 days with a predetermined amount of current flowing. Following the current [fol. 5771] test the tensile strength of the joint would be made.

(d) A thorough study of the compatibility of insulating materials with the various soldering fluxes that might be used would have to be made.

(e) Various flexibility tests in comparison with #18 AWG copper would be made. These tests conceivably could range from a simple twist with pliers to the more complex cable flexing machines that we have. A lateral loop test would be involved here also, which is simply measuring the number of cycles taken to break the conductor when two points of the conductor are held a distance of 12 inches apart

and these points brought together and separated. This again would be compared with copper.

(f) The effects of corrosion on aluminum conductors under various atmospheres would be investigated.

(g) The impact test would be made as well as the standard crushing test.

In all the above tests they did feel it reasonable to expect that aluminum would do at least half as well as the results on copper. Up to this point their limited investigation indicates that aluminum is roughly about $\frac{1}{3}$ that of copper with regard to flexibility. Our test results confirm this also.

Conclusions

1. Samples of aluminum conductor SPT-1 cord have been produced with a limited amount of success. It is believed that considerable improvement can be made but that EC grade aluminum will always be a problem from the standpoint of conductor breakage at the insulator. Breakage is no problem with copper conductor.

[fol. 5772] 2. Performance tests show aluminum conductor cord relatively poor in comparison to copper. Improvement may be attained if alloy properties can be developed.

3. A separator provides better processing and testing performance.

4. The preliminary cost data indicates that it would be possible to produce E.C. aluminum conductor cord at equal or lower cost as compared to copper conductor. Insulating costs because of use of separator and more breakage would probably remain higher than with copper. These could not be evaluated without production experience.

R. A. Schatzel.

RAS:mhc

CC: R. L. Williamson—Rome, C. H. Ellis—Rome, E. C. Hartmann—New Kensington, S. R. Chapman—New Kensington, T. L. Gilbert—Massena, C. L. Kessler—Massena, R. W. Adams—Pittsburgh, W. F. Lowry—New York.

2588

[fol. 5773] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 379

Mr. L. N. Grier—Pittsburgh
R. N. Wagner

June 17, 1955.

Firm of Edward E. Ashley
Consulting Engineers
10 East 40th Street
New York 16, New York

Dear Mr. Ashley:

We have given careful consideration to your letter of June 2 in answer to my letter of April 29th to you, concerning our proposal for a comparative study showing the economic advantages of utilizing aluminum building wire in lieu of copper building wire.

We certainly appreciate the time and effort that obviously has been put into the proposal outlined in your June 2 letter and after we have a clear picture of the basic engineering economics, then we will be in a better position to give careful consideration to undertaking the entire program as you have outlined it.

However, we feel that perhaps the basic economic advantage of aluminum should be evaluated before we decide on the mechanism for making this information available to others. We are particularly interested, at the present time, in the cost comparison study along lines outlined in my letter of April 29. Can you give us an estimate of just what this study might entail cost-wise? Also, can you estimate how long such a study might take?

Very truly yours, Aluminum Company of America,
R. R. Cope, Head, Electrical Section, Development
Division

RRC:mas

cc: Mr. P. T. Coffin—Pittsburgh, Mr. L. W. Grier—Pittsburgh.

[fol. 5774] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 381

Mr. R. J. Williamson, Dallas

Internal Correspondence

May 12, 1959.

From: Philip T. Coffin
Pittsburgh Office

To: Electrical Conductor Salesmen
District Mgrs.—Ass't District Mgrs.
Branch Mgrs.—Resident Managers
Administrators

Confirmation

This will confirm my telegram of May 11th as follows:
"We have received several reports today advising that Kaiser salesmen are quoting bare ACSR and aluminum conductor prices one percent off published schedules. Apparently covered conductors and service drop are not affected. Effective immediately we are reducing our prices by the same amount. New sheets dated May 11, 1959, are being published. Apparently Kaiser pattern is to reduce each price by factor of point nine nine and drop all digits beyond four decimal places. For example Peachbell X point 99 equals \$.465993. Call this \$.4659. Please follow this procedure pending receipt revised schedules. Revised prices will apply on all shipments made on and after May 11."

Philip T. Coffin.

PTC:ags

Copies to: Mr. L. P. Favorite, Mr. I. W. Wilson, Mr. R. V. Davies, Mr. R. B. McKee, Mr. F. L. Magee, Mr. L. E. Hickman, Mr. E. B. Wilber, Mr. A. P. Hall, Mr. N. B. Lane, Mr. F. J. Close, Mr. W. S. McChesney, Mr. W. J. Jenkins, Product Managers, Ass't Product Managers, Mr. J. V. Kohler, Mr. R. E. Coulter, Mr. N. M. Kehew, Mr. V. R. Chase.

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[fol. 5775]

Alcoa Private Wire

Copy

62 DA PI 5-11-59

K. V. Alexander

C. W. Beck

W. E. Moerschell

R. J. Williamson

Electrical Conductor Salesmen

District Managers, Ass't District Managers, Branch Managers, Resident Mgr., Chief Administrators

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Philip T. Coffin, Pgh.

PLAINTIFF'S EXHIBIT 382

POLYETHYLENE INSULATED CABLES FOR PRIMARY
DISTRIBUTION AND SIMILAR APPLICATIONS

By

R. C. Graham
Chief Engineer
CABLE CABLE DIVISION OF ALCOA

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The author presented a paper at the 1957 A.I.E.E. Winter Meeting on the subject "Polyethylenes For Higher Voltage Cables". It will be the object of this discussion to summarize elements of that and other information appropriate to primary distribution, together with a review of developments in this particular field.

Summary

Other authors at previous P.C.E.A. technical meetings have adequately covered the story of the birth and progress of polyethylene. Of interest to this group is the estimate that over 3,000,000 feet of polyethylene insulated power cable in the 5 to 15 KV ratings have been installed since 1947. Most of this is either underground, submarine, or in conduit - although considerable quantities of aerial cable are also involved.

Up until 1956 most of the experience was obtained in the plant distribution circuits of the chemical, oil, paper, and other heavy industry. Also, up until 1956 most utility experience with polyethylene was as insulation for station control cable, service drops, and series street lighting cables. However, since 1956 a steadily increasing quantity of polyethylene insulated cables in the 5 to 35 KV ratings has been installed by utilities for both underground as well as overhead primary distribution.

The satisfactory performance of polyethylene on these widespread and substantial historical applications point to an almost obvious expansion of its use which we believe will be principally in primary distribution circuits. Compared with other new non-metallic sheathed cable insulations, polyethylene has an outstanding performance record since World War II for these applications. In recognition of this experience the IFCEA-NECA industry group have recently issued interim specifications for polyethylene insulated power cable through 15 KV rating.

The logical question is why should this material receive such consideration and interest for distribution circuits where the environmental conditions of a chemical or refinery plant are not present and since other well established types of insulation such as paper, rubber and varnished cambric have been doing a satisfactory job? There are various interesting technical reasons including reduced weight and dimensions, but the principal attraction involves economies which will be discussed later.

Polyethylene Insulation Characteristics

The electrical, chemical, physical and mechanical properties of polyethylene have been thoroughly documented in the literature by many authors.

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Even while continuously immersed in water, it is electrically the best dielectric now used on solid insulated power cables. The electrical characteristics listed in the Table 1 are typical for polyethylene as compared with other conventional power cables.

TABLE 1

	<u>Polyethylene</u>	<u>Butyl Rubber</u>	<u>P.I.-L.C.</u>	<u>V.C.L.</u>
Dielectric strength (a-c)				
Volts per mil	500	350	950	300
Impulse strength per mil	1300-1800	900-1200	1700-2000	900-1100
Dielectric constant (60 cycles)	2.3	3.5	3.5	6.0
Power factor (60 cycles)	.0004	.015	.008	.060
Insulation resistance (Ω per 1000 ft.)	50,000	20,000	10,000	3,000

Since polyethylene is a thermoplastic, its thermal properties are of major significance and an understanding of these characteristics is essential in determining proper cable design, ratings, and operating limitations. For example, the coefficient of expansion (volume) at maximum operating temperature is about 10.0×10^{-5} which is greater than other power cable insulations. This means that special internal as well as external shielding methods must be employed in the cable design to eliminate possible void formation during load cycles. Its thermal resistivity is in the order of 300-watt-cm units which is about one-half that for rubber, paper, and VC insulations.

Up to its softening temperature all electrical and, incidentally, physical properties of polyethylene are unusually stable as illustrated by the power factor comparisons in Table 2.

TABLE 2

<u>Temperature Degrees Cent.</u>	<u>Polyethylene</u>	<u>Butyl Rubber</u>	<u>P.I.-L.C.</u>	<u>V.C.L.</u>
60	.0004	.015	.009	.070
70	.0004	.020	.015	.080
75	.0004	.025	.018	.087
80	.0005	.030	.021	.096
85	.0006	.040	.025	.110
90	.0007	.050	.030	---

* Maximum AETC

** Maximum ITCB

[fol. 5778]

The softening temperature for conventional polyethylene is 110°C and, when the entire volume of insulation reaches this temperature, it becomes soft in consistency, and upon cooling, could result in serious eccentricity and void inclusions. However, up to 100° centigrade the material exhibits negligible deformation (sometimes called cold flow) as illustrated in Figure (1). The development of higher density (linear) polyethylenes will appreciably extend the softening temperature.

This means that the limiting destructive temperature for conventional polyethylene is 110°C because of excessive softening. The destructive temperatures for other insulations are limited by other physical phenomenon but the end result is the same in that the cable will fail. For P.I.C.L. this value is in the order of 140°C because of oxidation of the oil and charring or carbonization of the paper. For V.C.L. this value is about 120°C. For ozone-resistant butyl insulation this value is in the order of 220°C. due to embrittlement and porosity of the insulation. For most polyvinyl chloride insulations this temperature is about 130°C because of excessive softening.

It has been demonstrated by test that a metallic sheathed polyethylene cable operated for a short time at an overload equivalent to a temperature well in excess of its melting point may, upon cooling, solidify in such a manner that the cable is still operative although an eventual repair or replacement is definitely warranted.

Table 3 illustrates a comparison of different 15 KV cable normal recommended maximum continuous operating temperatures as well as emergency overload ratings based upon 100 hours per year.

TABLE 3

<u>Cable Type</u>	<u>Maximum Normal Temperature</u>	<u>Emergency Overload Temperature</u>
Polyethylene	75°C	90°C
P.I.L.C.	81°C	96°C
V.C.L.	77°C	85°C
Butyl Rubber	85°C	100°C

The short time short-circuit ratings for polyethylene insulated cables with copper as well as aluminum conductors have been established and are given in an IEEE publication P-32-382 dated August 1958.

It is an usual misconception that a failure on a polyethylene insulated cable will result in considerable melting and "flowing back" of the insulation from the point of fault. Deliberate fault conditions with conventional protective devices have been introduced on cable samples to

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simulate this effect. It was observed that the destructive area was limited to the same few inches as obtained with conventional insulations under similar test conditions.

Perhaps some mention should be made at this point regarding the long time effect of heat on polyethylene insofar as aging and oxidation are concerned. In a paper, "Accelerated Heat Aging of Polyethylene" by S. P. Foster and W. W. Spahn which appeared in December 1955 issue of "Wire and Wire Products" the following conclusion was made regarding the effect of accelerated heating aging on polyethylene. "The crystallinity of the polymer increases, reducing the apparent elongation. There is no oxidation degradation of the polyethylene under the test conditions used. Heat aging actually improves the polymer for some applications, such as wire and cable, and gives better abrasion resistance and less heat distortion at a given temperature."

Cable Design, Manufacture and Specifications

The design and manufacture of a polyethylene-insulated power cable follows conventional principles except that special precautions must be observed to eliminate the presence of any air voids and to guard against their formation in service. Excessive or continued ionization (corona discharge) in such voids produces an "eroding" effect that may lead to an eventual concentrated thermal failure due to heat of the arc. This effect has sometimes been referred to as "cane cutting", which is a failure where polyethylene possesses inherently excellent resistance to cause. Because of the possible effects of internal corona it is recommended that only a cable design which has been proved to be corona-free at the operating voltage, both before and after load cycles, be specified. Failures due to this or similar causes on cable designed and produced in such a manner have been unknown.

The first important step in the design of a satisfactory polyethylene insulated power cable for the higher voltage ratings involves the use of a semi-conducting conductor shielding layer that is either adequately adherent to the polyethylene insulation or is one which may expand and contract at approximately the same rate as the insulation under load cycles.

Next, it is essential that the specified wall thickness of polyethylene insulation be extruded in such a manner so as to prevent any internal voids, bubbles, contamination, or strain. This requires a carefully controlled and gradual cooling of the insulation immediately after it leaves the die of the extrusion machine. We, based on test of our laboratories, recommend the use of high molecular weight natural (not colored) polyethylene for power cable insulation towards obtaining longest voltage life and maximum uniformity of other properties.

For the external shield, it is important to again utilize one of the various special or so-called "resilient" shielding methods to insure a corona-free cable at all times.

The outer jacket or covering may be either polyvinyl chloride thermoplastic

[fol. 5779]

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[fol. 5780]

or preferably black flame retardent (RoSeal) polyethylene in accordance with IPCEA specifications. Alternately, a lead sheath may also be employed as a covering either with or without further protective layers.

Because of economy and the advantages of longer lengths these cables are generally preferred in a single conductor arrangement although multiple conductor or triplexed assemblies may be satisfactorily designed and produced. The insulation thickness of the polyethylene has thus far been established as approximately 70% of the recommended thickness for rubber insulation which approaches dimensions of solid oil-impregnated, paper-insulated cable. This results in the comparative dimensions and weights for power cable as illustrated in Table 4 which indicates the possibility of easier and longer pulling lengths for polyethylene insulated and jacketed cable.

TABLE 4

Single Conductor 500MCM Copper, 15 KV Grounded Neutral		
Cable Type	Approximate O.D. (Inches)	Approximate Weight (lbs. per 1000 ft.)
P.I.L.C. (Unprotected)	1.42	4100
Polyethylene (Non-leaded)	1.60	2350
Butyl Rubber (Non-leaded)	1.80	2700
V.C.L. (Non-leaded)	1.57	4150

Installation

Relatively simple low-cost installation procedures may be followed on polyethylene insulated constructions. Where polyethylene jacket is employed, no special pulling lubricant other than water is needed for pulling in ducts or conduit. For aerial, direct burial, or submarine installations, the same precautions and methods should be observed as for conventional, non-metallic sheathed, rubber-insulated cable.

Manual splicing and terminating methods have proved satisfactory for polyethylene power cable. Potheads are seldom required unless for some special installation condition. When potheads are used, the only real difference from other potted cable terminals is in the special filling compound used with polyethylene. Certain materials such as polyisobutylenes of the desired viscosity have proved satisfactory.

Figure (2) illustrates a suggested splicing procedure for shielded cable. The splicing tape is a special self-sealing polyethylene base material that resembles and handles like a rubber splicing tape. Distance "L" varies from 8 to 10 inches on 5 KV cable and 13 to 16 inches on 15 KV cable. Figure (3) illustrates a manual procedure for makeup of indoor terminations and Figure (4) illustrates an outdoor terminal.

[fol. 5781]

Economics

Figure (5) illustrates today's approximate price relationship for similar typical sizes of 5 KV rated power cables with copper as well as aluminum conductors covered with ozone-resistant rubber, solid paper, varnished cambric and polyethylene insulations. Since there is only a moderate difference in capacities, we may evaluate all of these on an equal conductor size basis for all practical purposes. Analysis of this illustration indicates:

1. Polyethylene insulated cables provide by far the lowest cost unshielded non-metallic sheathed type of cable available today for this voltage range.
2. A 5 KV shielded polyethylene-insulated cable costs less than a 9 KV unshielded rubber-insulated cable.
3. Polyethylene-insulated cables are over 25 percent less costly than equivalent rubber-insulated designs.
4. The lowest initial shielded cable cost involves P.I.L.C. (paper insulated lead covered) which in the 9 KV range is about 5 percent less than shielded polyethylene. However, this differential could well be eliminated if evaluated on a "final installed" basis since the lighter weight and use of manual splicing and terminating methods for the polyethylene cable would provide appreciable savings in installation cost. Further, if a corrosion protective barrier or other coverings were added to the P.I.L.C., then even the initial cost of the polyethylene non-metallic sheathed cable would be less, since this latter cable would not ordinarily require such additional protection.
5. It is interesting that a 15 KV shielded polyethylene cable actually costs less than a shielded 5 KV ozone-resistant rubber-insulated cable for the same conductor size.
6. It is also significant that, at today's relative metal price for copper and aluminum, only polyethylene-insulated cables reflect any savings by incorporation of the equivalent size of aluminum conductor. In other cables, particularly rubber and V.C.B., the increased cost of coverings on the increased "equivalent" conductor dimensions more than off-set the relative metal savings; whereas the inherently lower covering costs for the polyethylene cables permit some metal savings. Of course, these differences will vary and are greatly dependent upon size and voltage rating.

Such economies warrant serious consideration of polyethylene-insulated cables for the lowest-cost underground primary system for residential distribution.

[fol. 5782]

Underground Residential Distribution

With recent development of the pad mounted transformer, this new form of distribution has become a popular subject with most utilities. It is not within the scope of this discussion to compare duct vs. buried systems or to compare the relative merits of 4160 vs. 12000 volt primaries. In any case, the cable cost is a very significant part of the total cost and it becomes imperative to seriously consider this element on an installed basis if the famous cost ratio to overhead is to be held within reason.

The previous dissertation on the economics of polyethylene insulation leads to the correct idea that here is a material almost tailor made for the job. Further, the incorporation of a lead sheath results in additional savings over a design involving shielding tapes and jackets. The overall lead sheath in proper thickness provides a truly impervious covering, full "tubular" electrostatic shielding, continuous grounding if buried, a degree of mechanical protection, and most if not all of the desired neutral capacity. This low cost lead sheathed, polyethylene insulated "concentric" cable design is now being used in substantial quantities by at least three operating companies. Simple manual terminating and splicing procedures are used. Occasional damage to the sheath does not result in cable failure since the insulation itself provides an adequate moisture barrier.

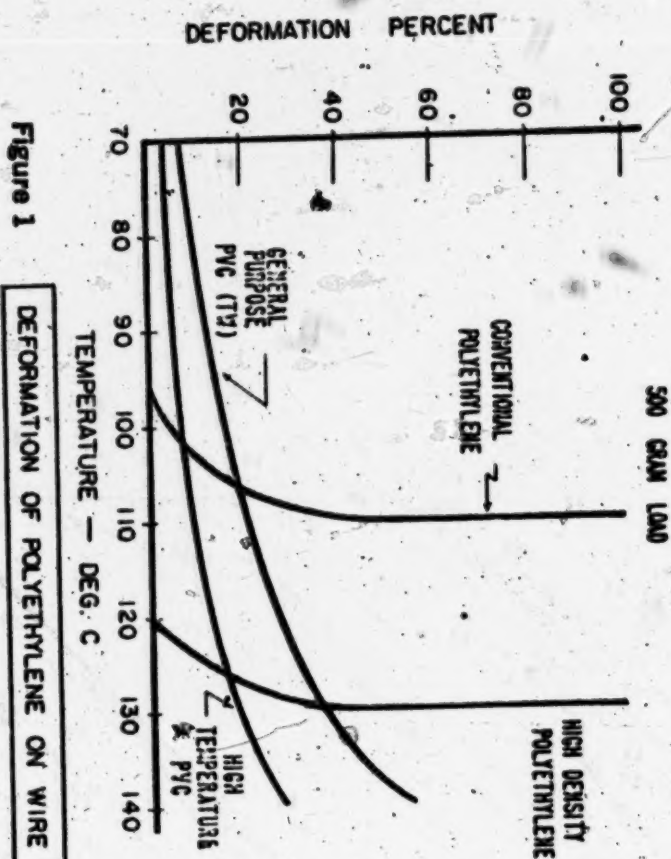
Over 15 KV

In addition to some European practice at higher voltages, there are at least three installations operating in this country in the 35 KV range. The first, installed in 1956, is described in the 1957 AIEE paper referred to in the opening paragraph. The second job involves an aerial cable installation described in AIEE paper 59-496, "A 35 KV Polyethylene Cable Installation" by G. J. Crowdes, and presented at the AIEE 1959 Summer General Meeting in Seattle. The third installation is very recent and involves nearly 10 miles of an aerial cable circuit at a large eastern utility. These applications lead to the belief that future developments will make polyethylene insulated cables practicable for circuit voltages in excess of this - perhaps as far as 69 KV, but not much beyond due to inherent material limitations.

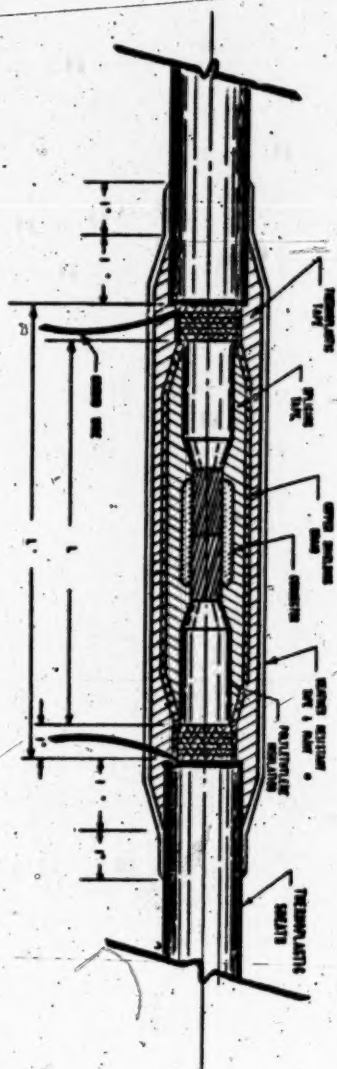
Future

New polyethylenes promise a bright future for cable insulation. The high density materials have interesting properties, such as higher softening temperatures and greatly increased toughness, although their inherent stiffness may limit their general application in power cable. Trial installations of this material on 5 KV overhead circuits have already been made. New cross-linked polyethylene polymers hold great promise and other polyolefins materials such as polypropylene may provide an answer towards still better cables. The possibility of irradiated polyethylene must not be overlooked in looking forward with polyethylene.

[fol. 5783]



[fol: 5784]



POLYETHYLENE INSULATED — THERMOPLASTIC JACKETED CABLES

Figure 2

[fol. 5785]

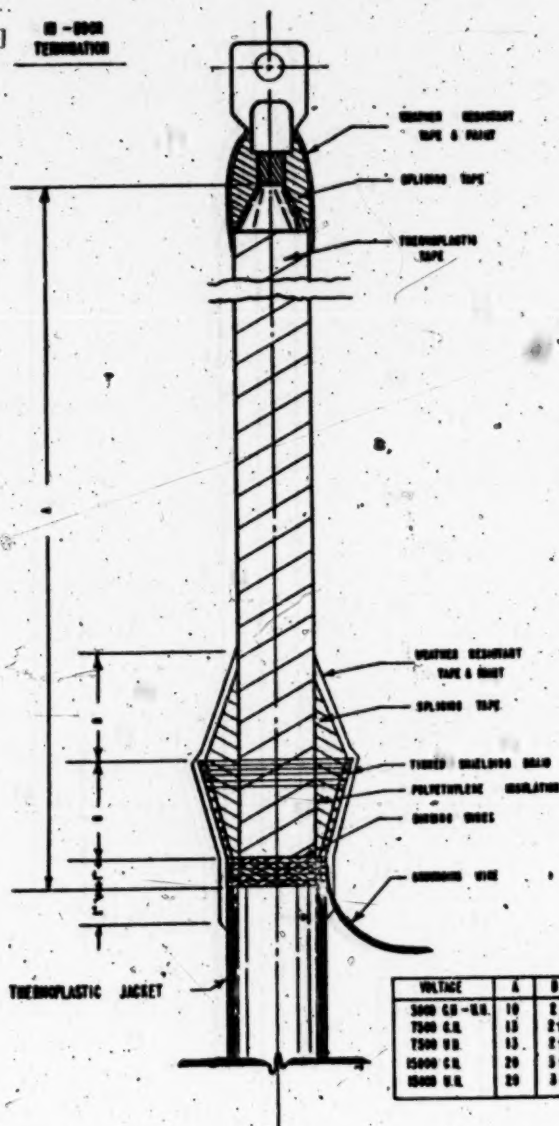
10-5000
TERMINATION

Figure 3

[fol. 5786]

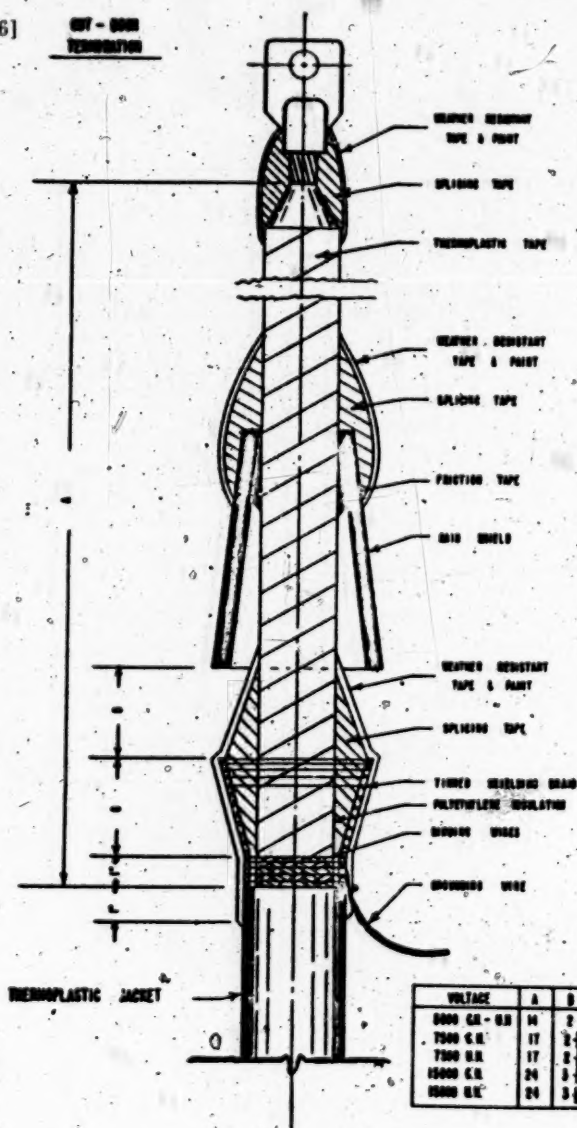
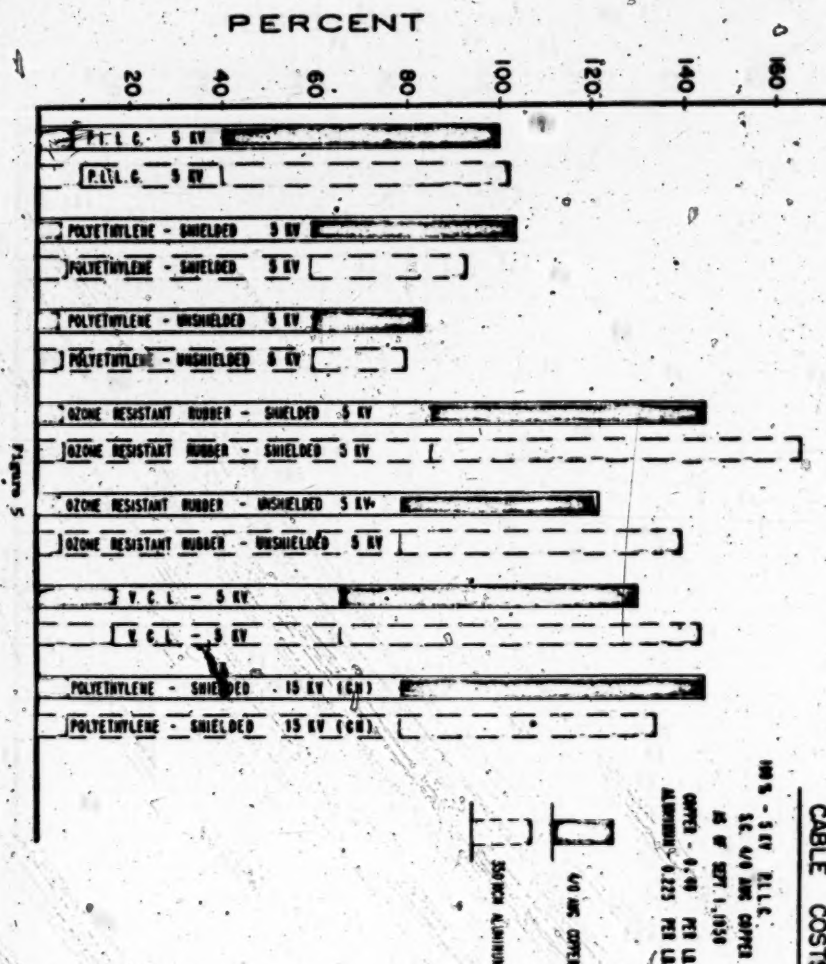
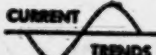
OFF - GUN
TERMINATION

Figure 4

[fol. 3787]



PLAINTIFF'S EXHIBIT 385

Overhead Cables
for DistributionNo. 6 in a series
of articles

Up until the last decade practically all overhead distribution involved some form of open-wire construction. Probably the most advantageous factor justifying this procedure has been economy plus an acceptable experience record. Like everything else, times are changing so that it is no longer axiomatic that open-wire circuits must continue to be used for overhead power distribution. Therefore, a brief story behind some of the modern cable designs for these applications may be of interest.

The need for cable is unquestioned. Overcrowded poles, severe tree conditions, storms, public relations, regulation problems and appearance are some of the contributing reasons for this need. The cable industry in recognition of this need has developed suitable cable products for almost every overhead distribution job and the Rome Cable Corporation has played a most active role in this progressive development. Cable costs have been so reduced by careful design and use of new materials that installed economies now closely approach open-wire construction in many instances. Today's distribution engineers would be remiss if he did not at least consider an appropriate type of cable for his new or replacement overhead distribution circuits. Rome Cable is prepared to supply all of these products and associated engineering services.

Primaries

There is a definite trend towards aerial cable in the 5 kv to 15 kv range but it is difficult to conclude whether this trend is more in factory-assembled or the field-assembled variety, since there are merits for each.

In the 5 kv range the cost of cable compared to open-wire construction may not be too attractive when evaluated on the installed cost per mile of line, averaging approximately twice as much. In the 15 kv range this picture improves somewhat. However, if this comparison is based upon final installed cost per KVA this differential between cable and open wire is considerably narrowed. Naturally, there must be other determining reasons for using cable, such as improved appearance, resistance to storms, less tree-trimming, better voltage regulation and greater reliability.

Preference for cable design in the 5 kv rating utilizes ozone-resistant rubber insulation (such as Rome Cable RoZone) with a suitable nonmetallic

sheath (such as Rome Cable RoPrep or RoSeal)... unshielded and relatively easy to hot tap, particularly when the cable incorporates the "reverse lay" feature. Economic preference for cable designs for the higher primary voltages, utilizes the same grade of insulation on each conductor covered with a bronze tape which serves as a combined shield and armor but makes "hot tapping" difficult and hazardous. These and other cables may be supplied with insulated copper or aluminum power conductors all properly bound to the correct Copperweld messenger as described in the new IPCEA-NEMA specifications for aerial cable or an equivalent type. Installation procedures for factory-assembled or field-spun cables are described in the technical literature as well as manufacturers' catalogs.

Secondaries

Until quite recently there has been relatively little activity or interest in going cable for overhead secondaries but several utilities have been investigating and experimenting with either field- or factory-assembled cables for this application. Joint pole construction, elimination of crossarms, reduction of hardware, ease of installation, improved appearance, storm resistance, improved regulation and less tree trimming are some of the features to be realized, provided final installed cost is not prohibitive.

It is here that aluminum, at least for the phase conductors, seems to offer definite economic and technical advantages since the lighter weight is a most useful feature for line construction. With the advent of the now popular Triplex construction for service drops the idea of a similar factory-assembled cable for secondaries has certain merits. For single-phase secondaries, this cable generally consists of two insulated aluminum conductors (usually #10 or #20 AWG aluminum) spiraled around a suitable neutral messenger.

When this cable is used on conventional 150 foot pole spacings the service taps can be made at or near each pole with special fixtures now available. However, it is obvious that greater savings are possible with increased pole spacings and "firing" and span service taps made where possible or convenient. Prefabricated devices to accomplish these taps have been developed. Thus,

the combination of Triplex secondaries and service offer a new and advantageous construction idea at modest cost.

When secondary sizes larger than #20 AWG are required, either spinning or a cable construction similar to primary aerial cable is suggested.

Services

The use of open-wire service drops is rapidly disappearing particularly in new construction and housing developments. Service drop cable, Type SD, utilizing concentric neutral has been too costly to merit universal acceptance unless some special feature such as reduced theft possibility was desired. Nine years ago the Rome Cable Corporation introduced the now popular neutral or self-supported Triplex type of service drop cable. This design received almost instant acceptance and has proven highly satisfactory. The power conductors, insulated with polyethylene, or Neoprene, are spiraled around a neutral messenger in accordance with IPCEA recommendations.

Aluminum unquestionably offers economic and technical advantages for the power conductors and has become the general choice of metal for this particular application. A popular neutral messenger has been a reduced size ACSR but the idea of hard-drawn copper has been gaining favor, particularly where there is planning towards Triplex secondaries with Copperweld messengers in order to provide copper-to-copper contacts on the exposed neutral. Consideration of the "combination" design is suggested.

For further information on Triplex services or secondaries we suggest you obtain Rome Cable Bulletin RS-5 and MST-1.

Tree Wire

This discussion would not be complete without some reference to so-called Tree Wire installed on insulators for overhead construction. For primaries and unusually important secondary circuits this product would cost considerably less than insulated cable and somewhat more than weatherproof wire. Where extensive tree trimming is a problem or too costly the use of the newer low cost special thermoplastic Tree Wire design might be considered. Here, again, Rome Cable is ready with the information and the product.

ROME CABLE CORPORATION, Rome, New York